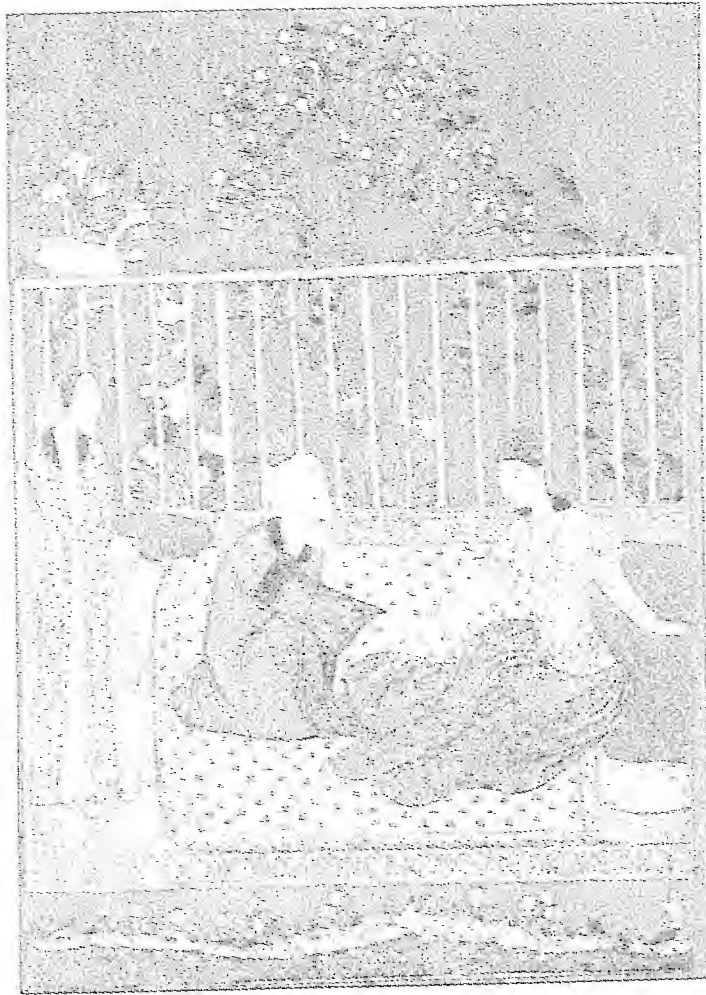


THE CANON OF MEDICINE  
OF AVICENNA

AMS PRESS  
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**A physician and his patient.**  
 From an early Persian MS. (Add. 27,261, f. 371b)

"A great sage—a reader of ancient books, Greek, Persian, Latin, Arabian, and Syriac; and skilled in medicine and astronomy, both with respect to their scientific principles and the rules of their practical applications; he was experienced in all that healeth and hurteth the body; conversant with the virtues of every plant, dried and fresh, the baneful and the useful. He was versed in the wisdom of the philosophers, and had compassed the whole range of medical science and other branches of the knowledge-tree."

*(4th Night—Burton; Lane.)*

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## PREFACE

THE purpose of the present treatise is two-fold :

(1) To furnish a translation of the First Book of the Canon of Medicine of Avicenna. The section on Anatomy has been omitted in favour of the first half of the *De viribus cordis*. This assists in the second object of this treatise. Distinctively large type is used for the translation.

(2) To present a study of its mystical philosophy (*tasawwuf*), especially showing where this and modern biological knowledge are reciprocally illuminative.

The words of the late Prof. E. G. Browne may be quoted here : " Even if we rate the originality of Arabian medicine at the lowest, I venture to think that it will deserve more careful and systematic study."

Furthermore, the Thomistic philosophy of human nature is specially discussed, and its applicability to the Medicine of the future is definitely enunciated.

A grateful acknowledgment is made to the School of Oriental Studies, London Institution (University of London) for signal help in the acquisition of the Arabic, Persian, and Chinese essential to the purposes of the treatise.

O. CAMERON GRUNER.

London, December, 1929.

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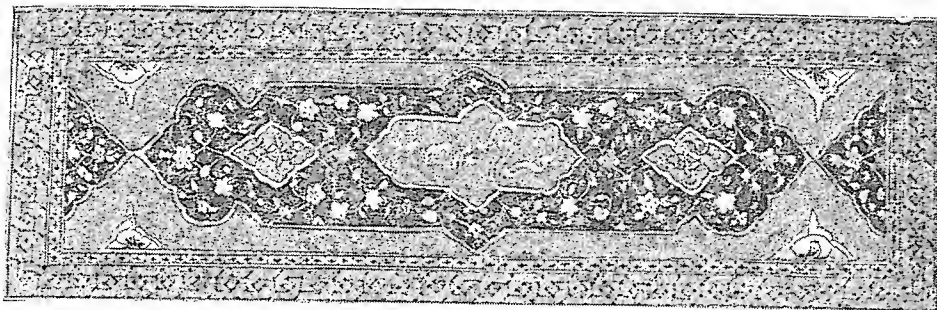
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## PRELIMINARY THESIS

### THE RELATION BETWEEN THE CANON OF MEDICINE OF AVICENNA AND MODERN THOUGHT



CONSIDERATIONS are not wanting which entitle the Canon of Medicine of Avicenna to an esteemed position in modern thought. In the first place, there is the outstanding intellectual culture of the Saracen Empire during the period of history to which Avicenna belongs. Secondly, in the case of much of his teaching, it may be said that the difference from ours is largely only that his speech is alien, and is apt to be misunderstood. In these days, the great complexity of the language with which we express our scientific thought corresponds with the intricacy of the instruments wherewith facts are elicited. Thirdly, many of the advances of modern times offer the solutions to the very theorems and propositions of former times. Finally, ideas are to be found in his work which provide suggestions for useful research in the future.

§ 1. The importance of idea over material achievement is not to be forgotten. The achievements of any age are subject to decay with the lapse of centuries, but the ideas which gave rise to them remain living through all cycles. Therefore to propose a real place for Avicenna in modern thought is not to propose a return, as it were, to old architecture, or the costumes of long ago. It is rather to render accessible to-day the picture which he painted, and so enable it to renew its still vital message. It is to play over again the music which he expressed, and enable perhaps one or two to rejoice in it. And this without obscuring the issue by discussing nationality, or schools of thought, or evolution of ideas, or technical methods.

If it appear to some a fault that the master appears to have used passages from other works, and this without full acknowledgment, it should be remembered that after all a painter may use pigments which someone else has manufactured, and is allowed even to employ other persons (usually pupils) to execute certain portions of his picture. Indeed, even after his decease, it is not improper that some may have been entrusted with the delicate task of touching up faded portions of the canvas which he bequeathed.

The place for Avicenna in modern thought is gained when it is agreed that he shall be viewed as one who entered this world entrusted with a mission independently to express for that age, by means of those various tools which he then found in it, the wisdom which is unchanging and impersonal. So also there is the need to-day that this same wisdom should be re-expressed for this age by means of the new data which lie to our hands.

## I

THE INTELLECTUAL CULTURE CONTEMPORARY  
WITH AVICENNA

§ 2. (a) *Intellectual Culture in the Central Saracen Empire.* Carra de Vaux, in his monograph "Avicenne,"<sup>13</sup> furnishes particularly striking comments, as follows (p. 156):—

"The more we investigate the enormous literary output of the Arabian empire, and come into intimate appreciation of the master minds of the middle epoch and of antiquity, the more we become aware of their sincerity.

"We should, we think, offer our salutations to these great personalities of that day, whose works and lives were equally encyclopædic. . . .

"Our own times do not show more worthy figures; we complacently assume that there are no more worthy than ourselves because science, so greatly developed to-day, cannot be held all within one single head. That may be. But it is only right to admit that science has less unity and harmony to-day than formerly it had; that it is less pure than it was under the grand peripatetic discipline. Our attitude towards that is neither humble nor sincere.

"In these days we are concerned too much to have our name blazoned forth than to grasp a great extent of science. We are more anxious to uphold the profession than to have a passion for study; we seek titles and reputation rather than real knowledge; and in order to appear more specialistic than our ancestors we expose ourselves to the judgment of posterity as having smaller minds, and fettered souls."

§ 3. (b) As to the state of civilization in *the western Saracen empire*, we have the very illuminating description of Ameer Ali in his "The Spirit of Islam"<sup>2</sup> (p. 392):—

"The Arabs covered the countries where they settled with networks of canals. To Spain they gave the system of irrigation by flood-gates, wheels and pumps. Whole tracts of land which now lie waste and barren were covered with olive groves, and the environs of Seville alone, under Moslem rule, contained several thousand oil-factories. They introduced the staple products, rice, sugar, cotton, and nearly all the fine garden and orchard fruits, together with many less important plants, like ginger, saffron, myrrh, etc. They opened up the mines of copper, sulphur, mercury, and iron. They established the culture of silk, the manufacture of paper and other

textile fabrics ; of porcelain, earthenware, iron, steel, leather. The tapestries of Cordova, the woollen stuffs of Myrcia, the silks of Granada, Almeria, and Seville, the steel and gold work of Toledo, the paper of Salibah, were sought all over the world. The ports of Malaga, Carthage, Barcelona and Cadiz were vast commercial emporia for export and import. In the days of their prosperity, the Spanish Arabs maintained a merchant navy of more than a thousand ships. They had factories and representatives on the Danube. With Constantinople they maintained a great trade which ramified from the Black Sea, and the eastern shores of the Mediterranean, into the interior of Asia, and reached the ports of India and China, and extended along the African coast as far as Madagascar.

" In the midst of the tenth century, when Europe was about in the same condition that Caffraria is now, enlightened Moors, like Abul Cassem, were writing treatises on the principles of trade and commerce. In order to supply an incentive to commercial enterprise, and to further the impulse to travel, geographical registers, gazetteers, and itineraries were published under the authority of Government, containing minute descriptions of the places to which they related, with particulars of the routes and other necessary matters. Travellers like Ibn Batuta visited foreign lands in quest of information, and wrote voluminous works on the people of those countries, on their fauna and flora, their mineral products, their climate and physical features, with astonishing perspicacity and keenness of observation.

" The love of learning and arts was by no means confined to one sex. The culture and education of the women proceeded on parallel lines with that of the men, and women were as keen in the pursuit of literature and as devoted to science as men. They had their own colleges (for instance, at Cairo, established in 684 A.M. by the daughter of the Mameluke Sultan Malik Taher); they studied medicine and jurisprudence, lectured on rhetoric, ethics, and *belles-lettres* and participated with the stronger sex in the glories of a splendid civilization. The wives and daughters of magnates and sovereigns spent their substance in founding colleges and endowing universities, in establishing hospitals for the sick, refuges for the homeless, the orphan and the widow."

§ 4. (c) Cordova, the most celebrated western university of the Empire at the time of Avicenna.—This is well known as an instance of the high degree of culture of the day. Ameer Ali,<sup>2</sup> speaks of " that wonderful kingdom of Cordova, which was the marvel of the middle ages, and which when all Europe was plunged in barbaric ignorance and strife alone held the torch of learning and civilization bright and shining before the western world." The greatness of the city is indicated by its population, which is given by Haeser<sup>26</sup> (i. 662) as 300,000, and by Campbell<sup>12</sup> (p. 57) as one million ; and by the library of " about 200,000 " volumes. To see the city to-day, traversed as it can be from wall to wall, within half an hour on foot, and to read of an extent of " 24 miles one way, and six in the other " (Ameer Ali<sup>1</sup>, p. 517) shows that the word " kingdom " conveys a truer idea of its greatness. To read of " innumer-

able libraries, 3,800 mosques, 60,000 palaces and mansions, 200,000 houses inhabited by the common people, 700 baths, 80,000 shops, besides hostels and serais " is to wonder how so much can have come to be now represented by so little.\* Nevertheless, the "grand mosque" alone, which is still at any rate externally intact (and interiorly is still surely one of the wonders of the world despite its mutilation) stands sponsor for the rest; and no doubt many of the existing imposing buildings—now devoted to very different uses—stand for the palaces and mansions. As to the literary treasures, these have been traced at least in part from Spain to Fez, as shown by Horne<sup>33</sup> (p. 32, 61), with the *Roud El Qartas* as his authority; and he then points to years of pilfering from the library of the great mosque of El Karouiyan at Fez, as having scattered these works for ever out of ken.

§ 5. A study of the street names, and even the place names and current dialect in "Moorish Spain" to-day also confirms the story of past greatness. But the mystical knowledge displayed in the dispositions of the decorative designs and their poetic inscriptions on the walls of the Alhambra halls, state-rooms, and private apartments can leave no doubt of unsurpassed artistic power, where every sense-impression was deliberately drawn on. Lights and shadows, and colours changing with the hours of the day; musical effects of simultaneous diversity of disposition of flowing water; perfumes; courting of the prevailing breezes; interior architectural form; and furnishings, animate and manufactured—all these were combined for the achievement of a perfect representation of (divine, over and above human) Beauty.

§ 6. (d) *Among the Chinese.* The bearing of Chinese philosophical thought on the subject of Avicenna lies in the fact that we here meet with a notable example of intimacy of relation between world-conception and Medicine. The writings which are so carefully studied to-day by so many sinologists were extant at the time of Avicenna, and are still held in the highest esteem by Chinese thinkers. The modern Chinese philosopher is supposed to say to the Westerner (Somerset Maugham<sup>54</sup>): "What is the reason for which you deem yourselves our betters? Have you excelled us in arts or letters? Have our thinkers been less profound than yours? Has our civilization been less elaborate, less complicated, less refined than yours? Why, when you lived in caves and clothed yourselves with skins, we were a cultured people. . . ." The attitude towards western learning so displayed may be blamed by many, but is certainly praised by those who have studied the philosophy most deeply. As long ago as 1876 we read conclusive evidence (by Sir Henry Howarth<sup>35</sup>) that much of our vaunted civilization actually came from that ancient race. If some students discuss their philosophy with a certain cynicism (Forke<sup>23</sup>), others (Bruce<sup>11</sup>, Wilhelm<sup>101</sup>) see into the justice of their conceptions. As Carus<sup>15</sup> remarks: "We need not be blind to the many errors and absurdities

\* "Every dwelling-place, even if it has been blessed ever so long, will one day become a prey."—(Old saying quoted by Ameer Ali,<sup>1</sup> p. 125.)

of the ancient occultism to understand and grant the truth that underlies its system." These words are exactly applicable to the Canon of Medicine of Avicenna.

It should be added that errors and absurdities are apt to be ascribed to ancient authors which really arose from misunderstandings and ignorance on the part even of contemporary pupils. The subsequent generations perpetuated the errors, and even in these days the attempt to represent the real meaning of ancient texts by translations exposes one to unexpected extraordinary pitfalls. Our idiom is so diverse from the technical Chinese.

## II

THE NATURE OF THE KNOWLEDGE PRESENTED  
BY THE CANON

§ 7. (a) *The Canon is a précis*, and not a sum-total of Avicenna's knowledge. Numerous passages occur in the Canon which show that this is the case, that it is a series of notes or skeleton outlines of thought not too lengthy to be memorized by his students (5)—much as they would memorize the Quran. Thus: (2) "to the full extent necessary, and yet with apt brevity," (16) "do not place in medicine what does not belong to it," (34) "having discussed the equable temperaments *sufficiently*," (80) "I purposely omit reference to certain other problems relative to the fluids of the body": "just as much as is necessary to enable you to practise medicine intelligently." Many passages also refer to others of his own works for further details, to avoid confusing the purely medical issue of the Canon. These (philosophical) works are gradually becoming more widely known.

"Generally speaking, the saying of the saints and sages are terse, presenting only the germs of truth; these are developed by later teachers and then expanded and added to. We must see to it, however, that we get at the original meaning of the saints and sages." (Chu Hsi<sup>10</sup>, p. 168.)

"Books are only words, and the valuable part of words is the thought therein contained. That thought has a certain bias, which cannot be conveyed in words, yet the world values words as being the essence of books. But though the world values them, they are not of value; as that sense in which the world values them is not the sense in which they are valuable." (Chuang Tzu, Giles trans. p. 170).

§ 8. To say that a work is the product of the age in which an author lives is certainly often an error, for it is to confuse the person's insight with the tools (the language at his command) available to express himself with. Similarly to work out the relation between a literary work and the religious belief of the author, as for instance to show the relation between Islamic science and the Koran carries the same fallacy with it. The Prophet says "every soul when born is a faithful follower; it is afterwards that he becomes unfaithful"—which is to say that the form of religious belief is a secondary implantation, whereas the spirit of a sincere life can be traced to the original being.

Avicenna's medicine, like Indian medicine, has been traced to the Greek system. But it has been proved that the great works of Charaka and Susruta were available in Arabic, under the title of Kitab-Shawshura-al-Hindi, from the seventh century ("Ayurveda," 1924, i. 1; and see also Weber, Hist. of Indian Lit.).—Similarly, the view that the Chinese borrowed their philosophy of the five elements from the Turks has been sufficiently disposed of by Forke. (p 242, 243).—It is beside the purpose of this treatise to take up such questions.

§ 9. The common notion that progress or stagnation in secular knowledge has a causal relationship with (a certain) religion is typically voiced in his address on "Medicine and the Church," by Sir Farquhar Buzzard<sup>103</sup> (1927). The comment to make is: "*post hoc sed non propter hoc.*" The advances in the science of medicine, as in all other sciences, are surely a part of the (divine) plan for mankind; whereas the collateral abandonment of religious fundamentals remains a human responsibility.

§ 10. (b) *The word "Canon" (Qanun).*—Equivalent words: code of laws; series of principles. Tao 道 (cf. Forke<sup>24</sup>). Principle is defined as "something antecedent, which exercises a real positive influence upon the consequent" = Causes (four kinds, 13) = Reasons.

In view of this it is clear that the Canon is not properly to be regarded as an "encyclopædia" of the knowledge of the time, or to be contrasted, for instance, with the now classical "Osler."

§ 11. (c) *The word "knowledge."* Knowledge is not simply an assemblage of "facts"; nor is it to be made synonymous with "truth"—certainly not Absolute Truth, of which all human knowledge falls short (see diagram in Appendix), although one single word is capable of containing or implying all knowledge, as in mathematics a single term may be equated with an infinite number of terms summed together. But even the mathematical sciences can only afford approximate truth (Hume, quoted by Maher<sup>50</sup>: p. 238). We may recall the words, "if he attain to all knowledge, he is far off still" (à Kempis<sup>95</sup>, ii. 11).

§ 12. Facts, as S. Thomas<sup>81</sup>, (i. 53) explains, are what our intellect regards external objects as, and as we judge of them only in terms of our sense-organs, these objects may be different. God knows them as they are. Our intellect depends on our imagination, and that depends on our senses, and our senses only convey discrete fragments which we gather into one continuous impression regardless of intervening points." We live as it were in a network only the nodes of which are evident to the senses.

§ 13. (d) *Mystical Insight.*—There is a distinction between knowledge gained in the ordinary manner and that gained by "mystical insight" (*Kashf*). The writer of *Gulshan-i-Raz*<sup>25</sup> (couplet 299, p. 30) advises his readers to follow this, saying:

"Straightway lift yourself above time and space,  
Quit the world and be yourself a world for yourself."

And:

"The moment we are enlightened within,  
We go beyond the voidness of a world confronting us."  
—Seng-ts'an, quoted by Susuki,<sup>81</sup> p. 185.

As this "opens up all of a sudden a world hitherto undreamed of, it is an abrupt and discrete leaping from one plane of thought to another" (ib. p. 200).

"Real science is seeing the fire directly,  
Not mere talk, inferring the fire from the smoke.  
Your scientific proofs are more offensive to the wise  
Than the urine and breath whence a physician infers."<sup>87</sup>  
—(p. 306.)

"Man looks at the surface of the ocean. Yet he is so small that he cannot even be compared to one of its drops, limited as he is in intellect and in his knowledge. It is only to those who, having just touched creation, bow to God, forgetting their limited self, that God has remained. These through whom God has spoken are the only beings who have been able to give any truth to the world."<sup>32</sup>—(*Rose-garden*, 1st ed., 120.)

§ 14. "The mind is not like a horizontal door which has to be made larger by force. You must clear away the obstructions arising from creaturely desire, and then it will be pure and clear with no limit to its knowledge. Heng Ch'u said: "When the Mind is enlarged it can enter into everything throughout the universe" Chu Hsi<sup>10</sup> (i. 182). "He who praises God knows about Him."

This attitude towards Nature is to be claimed for Avicenna, on the plain evidence of his other writings, including the "Al Najat" which appropriately appears in the Arabic version of the Canon printed at Rome in 1593, and of the Libellus on the powers of the heart<sup>4</sup> (real authorship disputed) which Arnold of Villanova translated into Latin (ca. 1235-1312)—and is included in the Latin edition of the Canon, 1595.

The acquisition of knowledge by this process demands nothing more than a keen observation of the life around us, and was as much within his reach as ours. Such knowledge is not too restricted to one period of history, one language, or to one or two universities. And if it should seem that because our civilization is so different his opportunities were much less, we may pause to reflect that the difference between our age and his is chiefly one of mechanical appurtenances and phraseology; and that even to this day we need not travel far (e.g., the old streets of Cordova and Granada, or more definitely, to northern Africa) to see much the same sort of scenery as he was accustomed to, much the same sort of life as is drawn in the "1001 Nights." In any case, what is human life, at bottom, but a matter of buying and selling, receiving and giving, seizing and relinquishing, constructing and demolishing, acquiring learning and losing it, seeking power and breaking it, bidding and forbidding, covenanting and comminating, giving in marriage and seeking to obtain in marriage, birth and death.

§ 15. The significant phrase "seeing into one's own Nature" (Hui-neng: Susuki,<sup>21</sup> p. 203, in which most admirable work occur many passages by way of explanation) gives a graphic description of that which gives Avicenna his superiority. The Canon is simply the *medical garb* in which the one Truth is expounded. It is for us also to perceive it in whatever idiom it might be described—Western, Eastern—Islamic, Confucian or Buddhist, e.g.

It would then seem as if the mind were now able to float as it were round all the concepts man has ever given to the world, or round all the most familiar events of one's daily life, and perceive clearly that which can never be set forth in words. We should then also quote the words (given in *ib.*, p. 223, in reference to *satori*—enlightenment) "I perceive of it that it is something, but what it is I cannot perceive. Only meseems that, could I conceive it, I should comprehend all truth."

§ 16. Further than this, to find that some of the statements in the Canon are certainly erroneous, and that modern investigations have placed us at an infinitely greater advantage, does not invalidate the work as a whole. Its possibilities for suggesting thoughts of real value to-day are more realized the more one reads "between the lines," and the present treatise does not claim to exhaust them.

"Let not the authority of the writer offend thee, whether he be of title or great learning, but let the love or pure truth entice thee to read" (à Kempis<sup>95</sup>, i. 5).

§ 17. Insight into eternal truths.—A person may (a) glimpse them, (b) understand them moderately, (c) understand them fairly thoroughly. But in describing them to another, he may explain them (i) imperfectly (no one can explain them properly!), (ii) inadequately or incompletely, (iii) wrongly, because of (a) imperfect education, (b) educational bias, (c) religious or anti-religious bias, (d) inherently erroneous methods of thought, (e) restriction to logic. Such truths, again, may be denied by persons being told of them, for because in their turn they misunderstand, or understand only in part, either through careless attention, and (a) to (e).

§ 18. Insight *versus* Intuitional Knowledge.—A note should here be made that the term "insight" as used here bears a rather different meaning to that pertaining to the term "intuitive knowledge," which S. Thomas<sup>93</sup> ascribes solely to the angelic mind, and defines as "the attainment of the truth of a thing at a single glance without the aid of reasoning" (liv; lv. 2; lviii.3, 4;<sup>94</sup> vol. 3, p. 51-87; Pegues,<sup>73</sup> p. 18). On the other hand this mode of perceiving truths need not be disallowed a rudimentary commencement among the powers of the human soul, just as the "brute" mind must be allowed to contain rudiments of those high mental capacities which characterize the human being. Throughout all orders of creation, the lower are endowed with the scaffolding for the manifestation of successively more exalted capacities of the higher.

### III

#### THE BASIC DIFFERENCE BETWEEN "THE CANON" AND MODERN MEDICINE

The Canon treats of	Modern Medicine consists of
I. Speculative "Medicine." Certain fundamental principles (Cosmology, psychology, metaphysics)	
II. Practical Medicine.	
A. Application of I to the study of (i) health, (ii) disease (tendency, predisposition, threshold stage, declared disease, (iii) cessation of life.	A. Principles of Medicine Theory: The application of the facts of chemistry, physics, anatomy, biology to the systematic description of innumerable "diseases" classified as far as possible on the basis of the microbic theory. Symptomatology. Etiology. Diagnosis.
B. Actual treatment of "disease" by (i) regimen, (ii) drugs, (iii) operative interference.	B. Practice of Medicine. (a) Laboratory work. (b) Therapeutics, pharmacology and dietetics. (c) Surgery. (d) Gynaecology and Obstetrics. (e) State Medicine: Hygiene in all its branches. (f) Psychological Medicine: Treatment of insanity. (g) Legal medicine, etc.

Modern medicine is based on the conception of the universe as a conglomeration of dead matter out of which, by some unexplainable process, life may become evolved in forms. To Avicenna the whole of the universe is the manifestation of a universal principle of life, acting through the instrumentality of forms. Or, again, in modern medicine, the forms are the source of life ; to Avicenna they are the product of life. Space itself is an aspect of the one life (Hartmann, on Paracelsus, <sup>28a</sup>, p. 217).

§ 19. In this way the difference between Avicenna's conception of "principles," and that of modern medicine is easily shown. To the school-boy "science" would consist of (a) "bookwork," (b) laboratory work, which his teachers would insist is the basis of (a). Similarly, the medical curriculum begins with lectures, though these are more and more inclined to become laboratory demonstrations ; and goes on to laboratory and hospital work.

§ 20. In short, Avicenna's medicine, and all ancient medicine, is intimately bound up with philosophy, to wit, *that of human nature*—a philosophy which proves to be virtually identical with "modern scholastic philosophy," no doubt partly because the Quranic account of the origin of Man tallies with the Christian.

§ 21. Modern Medicine, on the other hand, assuming the title and rank of a positive science, emphatically discards and excludes it. Hence we read : "the physiologist" (said Burdon Sanderson) "can pursue philosophy if he has a turn for it, but must understand that the moment he enters the field of philosophy he leaves his tools behind him" ; or "it is unfortunate that the limitations of scientific thought were often ignored by men of science in their writings . . . the result diverts those who know, but befogs the unsuspecting reader who will probably put the blame on his intelligence" (Ed. Hughes<sup>36</sup>).

"According to Positivism, science cannot be as Aristotle conceived it, the knowledge of things through their ultimate causes, since material and formal causes are unknowable, final causes (are) illusions, and efficient causes (are) simply invariable antecedents, while metaphysics under any form is illegitimate" (Sauvage,<sup>17</sup> xii. 313). Or, expressed more boldly, "philosophy" is considered to be the exact antithesis of the truth which modern medicine gives us, and is therefore inherently inadmissible to medicine.

The ignorance which accounts for this attitude is only met by insisting on proper definitions of terms. The following apply here : Philosophy is "the science which is concerned with first causes and principles ; it is the profound knowledge of the universal order, and the duties which that order imposes on man (Mercier, *Logique*, 1904 ; de Wulf<sup>17</sup> : xii. 26). Again, philosophy is the true perception and understanding of cause and effect.—Metaphysics is "that portion of philosophy which treats of the most general and fundamental principles underlying all reality and all knowledge" (Maher<sup>56</sup>, p. 520).—Psychology is "the science which treats of the soul and its operations"—and, therefore, clearly, must be the real foundation of Medicine.

§ 22. It is in modern scholastic philosophy that the student finds ample exposure of the fallacy in positivism and its cognates, enabling him to detect the difference between false and true, expressed with enough force of logic to satisfy the most meticulous. This queen of all the sciences amply proves positivist science (including Medicine) to be incomplete knowledge when taken alone. The knowledge of movement or change must be supplemented by mathematical and metaphysical view-points. (Cf. Mercier,<sup>56</sup> pp. 35, 36; and especially Wundt<sup>17</sup>: xii. et 35). Such men as Albertus Magnus and Roger Bacon were convinced of the necessity of linking the sciences with philosophy<sup>17</sup> (xii. 38).

When medicine has in this way become ennobled it reaches its highest degree of perfection, in that it penetrates to the very depths of reality<sup>56</sup> (p. 9), admitting this knowledge to need, even then, a further complement to make it complete—namely, knowledge in relation to God ("Christian wisdom").

"Sapientia est scientia quæ considerat causas primas et universales causas. Sapientia causas primas omnium causarum considerat" (In. Met. I., lect. 2). "Ille qui cognoscit causam altissimam simpliciter, quæ est Deus dicitur sapiens simpliciter, in quantum per regulas divinas omnia potest judicare et ordinare" (Sum. Theol. II-II. q. 45, art. i.c). "Non acquiritur studio humano, sed est deorsum scendens (*ibid.*, ad 2). "Cum homo per res creatas Deum cognoscit, magis videtur hoc pertinere ad scientiam, ad quam pertinet formaliter, quam ad sapientiam ad quam pertinet materialiter: et e converso cum secundum res divinas judicamus de rebus creatis, magis hoc ad sapientiam quam ad scientiam pertinet (*ib.* q. 9, a. 2, ad 3).

As St. Thomas<sup>81</sup> said in his day, "they think that nothing exists besides visible creatures" (C.G., ii. 3, l.p. 5) [N.B.—"Creatures" are (a) animate, (b) inanimate]; "they think that things proceed not by the divine will but by natural necessity" (*ib.*). So even in those days time and fortune were expended on researches which sound philosophy would have shown to be inherently futile.

We may reflect for instance on the reiterated search for a location of the soul, which the pioneer anatomists prosecuted, and also on the commonly repeated announcement to successive students of anatomy that the pineal gland is now no longer regarded as the site of the soul. There is the sub-conscious suggestion to the student that scientific research has effectively disposed of the mediæval belief in the soul, whereas history only proves that the revolt against the precise teachings of the Council of Trent<sup>16</sup> (1545-1563) necessarily came to naught. The very definition of "soul" which this council laid down makes a search for its location ludicrous.

#### IV

### SPECIAL DIFFERENCES BETWEEN THE CANON AND MODERN MEDICINE

#### A. Conceptions known to Avicenna; not now recognized.

§ 23. There are four main conceptions belonging to the Canon, but not recognized by modern Medicine. To use S. Thomas' words<sup>83 84</sup> (i. 32; art. 1; p. 270) they can be shown to be "not impossible"; that is, the discoveries of modern science do *not* abrogate them.

These conceptions are relative to (*a*) the nature of the human being as a whole, (*b*) the constitution, (*c*) the "breath," (*d*) the "elements." Each of these is dealt with in some detail under the corresponding sections of the Canon, but some of the salient points are suitably referred to at this stage.

§ 24. (*a*) *The conception of the nature of the human being as a whole.*—The varieties of views on this point which people in every country and race exhibit both in conversation and in literature, numerous though they are, are capable of classification under one of three headings :

(i) The *first*—the *Platonic* view—regards the human being as "soul within a body," while admitting "soul" to be indefinable, and beyond the power of location. This view, widely supposed to be "Christian," is well known as "pagan" to students of folklore.

(ii) The *second*—the *scientific* or rationalistic and modern view—takes the physical body as the fundamental, seeing in it the outcome of known or at least knowable forces. The facts of anatomy, physiology, etc., convey their own inevitable conclusions. This view makes its immediate appeal. From the first lesson the pupil is able to feel a grasp of some tangible knowledge, whereas the alternative third view entails a long study before the intricacies of abstract philosophy can be mastered. The difference between experience and "poring over books" is only too obvious. The possibility of interweaving the two methods is not on the horizon.

In its answer to "religion," this scientific view has no objection to raise to its votaries retaining a private belief in the Platonic view, if their temperament demands it. But this "pious belief" must not be allowed to vitiate procedure when scientific research is undertaken.

This modern conception regards the body as an aggregate of "spare parts" which are "assembled" well, or ill ; can be repaired, or remedied. According as the assembling is good or bad, and according to the "fuel," so is there health, or susceptibility to infection by organisms. The kind of assembling is a matter partly heredity and partly of environment.

The following remarks in a review on a recent article in *Science*—by Lillie—may be quoted from the *Times*, Oct. 24th, 1927, p. 19. They present the idea in technical language :—

"Physiology finds the organism to be a nexus of physicochemical determination ; differing only from non-living systems in its complexity. . . . Speaking of freewill, one argument against 'indeterminism' is that 'the energy balance sheet of a man shows us there is no creation of energy within the body.' To assume will-power 'we conflict with Newton's first law.' . . . The ultramicroscope alone suggests indeterminism, and even this may be only because we do not know enough about Brownian movement, etc. Protoplasm is a 'heterogeneous system.' In heredity submicroscopical units determine the details of inheritance—but an event originating in an ultramicroscopic particle can spread to the whole cell or organism. On this view, a human action appearing entirely spontaneous and voluntary to the actor and spectator would exhibit itself as a succession of mechanically determined events capable of study and prediction in all its microscopic details. But traced inwards it would ultimately resolve itself into certain ultramicroscopic events in the interior of the nerve-cell." But "even the freedom of the ultramicroscopic particle may be no more than a subtler kind of determinism beyond the reach of present analysis." §64 contradicts these remarks.

It may be noted, in passing, that the doctrine of vitalism is really only another form of rationalism, as will appear when the scholastic doctrine is duly investigated.

§ 25. The *third* view—*scholastic, Thomistic*—presented by modern scholastic philosophy, has the Aristotelian basis. Its soundness is best appreciated by careful study prolonged until the prevalent inadequate and illogical conceptions of the universe are clearly exposed. Briefly, the view is expressed in the words: "the human being is a material body vivified by a life-principle, the two together constituting the rational human soul." As S. Thomas<sup>84</sup> says: "It is not my soul that thinks, or my body that eats, but 'I' that do both" (p. 25). In other words, again: *The body and "soul" form one complete whole—one "single being"*<sup>38</sup> (p. 53); <sup>56</sup> (p. 302, 306).

It is this view which underlies the whole Canon, and is expounded in connection with the corresponding parts of the text. It is this view that makes the ancient work fall in line with the most "modern." Its consequences are far-reaching. The external configuration of the body, including the physiognomy, is a reflection of the functional capacity of the internal organs and general make-up of the individual. The character, talents, physical form, shape of individual features, general development, and indeed every detail of the physique, length of limbs, of fingers, cutaneous markings, contour of the eyes and ears, etc., are all part and parcel with the functional conformations of the viscera, and the mental characters; a study of the visible will inform of the nature of the internal conformation. (Cf. 107)

§ 26. The idea that from a study of external features and general habit one should deduce conclusions as to functional capacities\* is generally opposed by academic Medicine; as is voiced by F. v. Müller (1921, quoted by Kolle, Mitt. Ggeb. Med., 1926, 40, 371) when he says "we must steadfastly avoid drawing any far-reaching conclusions about the functional behaviour of the organism from a study of the external characters of the body."

While it may be urged that the external features are usually misread, it may also be admitted that even the customary "physical examination" of a patient does not yield uniform results when practised, as it necessarily is, by persons of varying talent. Surely, the remedy is to exert greater care. We may, for instance, observe how a skilled weaver will detect the site of a flaw in the "set-up" of a loom by a mere glance, whereas a novice discovers it only after laborious search. See § 163.

On the other hand, the biochemical tests for functional capacity of organs—so much the vogue, and so much exploited, and so duly impressive on patients and their friends—are clearly inadequate in the light of the scholastic doctrine. It is true that the attempt to force the intangible to yield to mathematical formulæ, rules, and weights and measures (as, for instance, in blood-cholesterol analyses) is sincere enough, to judge by the time, energy and money expended so freely. But what is to be the verdict once it is realized that the anatomical organs are not functionally discrete or amenable to distinctive "specific" tests? A just appreciation of the intimacy of relation inherent in the conception of the human being insisted on here suffices to show the futility of those labours and studies whether made upon man or upon the various orders of animals taken instead.

More than this, there is the conception that the internal organs belong to one another beyond the anatomical limits. The heart, to anatomy, is a circumscribed organ; to Avicenna it is part of a force occupying the whole body. "Man's heart is both corporeal and incorporeal" (Chu Hsi<sup>10</sup>, i. p. 162). So, again, the liver is simply a visible portion of a "liver" whose operation pervades the whole

\* The relation between character and physique was scientifically studied by the Chinese 450 B.C. (Cf. Wieger.)

body.\* Or, to combine modern with ancient knowledge, the physical heart, the arterial vessels, and the sympathetic nervous system, including the connections between this and the sensorium and that which corresponds to the "sensitive soul" in its emotional aspect, for instance—all this is one great composite; and its state is also reflected in many subtle indications which offer themselves to the keen observer of the patient.

The modern research on diseases of the brain and insanity is based on the assumption that the material brain is the source of all nervous activities, which are correlated with definite biochemical, physicochemical and even structural changes in brain substance. Mental disease is the outcome of similar changes. The Platonists would consider mental disease as apart from the "soul." The Thomistic view leads to much more subtle conclusions, capable of lasting influence.

(b) *The doctrine of "the constitution."*

§ 27. The term "constitution" conveys different ideas to different minds. The laity regard the term as synonymous with "temperament" or "make-up," at least in part, and consider a description of a patient as having a nervous temperament, a delicate constitution, etc., quite adequate. With this goes the conviction among the lay that the medical curriculum leaves the graduate fully able to "understand his constitution" whereas in actual fact the subject is never discussed. The study of physique is quite superficial, and is admittedly made solely to establish a diagnosis of specific "diseases." Hence the term, in conversation, is actually nothing more than platitudes.

To modern medicine, regarding the body as corporeal, constitution is a matter of physique, resistance to disease, mode of reaction to various stimuli (including psychic stimuli). Classifications of varieties of constitution on this basis are afforded by various writers in all countries—e.g., a classification into athletic, leptosomic and dysplastic; into arthritic, endocrine, lymphatic, asthenic, infantilistic, chlorotic, etc. (Current medical journals).

In the Canon, Avicenna establishes "constitution" in terms of humours, temperaments (hot, cold, dry, moist) and "elements" (whose proportions are set for every individual.—47). If we go further, and apply to this term the method which Rumi<sup>37</sup> (p. 169), the great Persian sage demanded of students of the Quran, we shall not regard a patient's constitution as understood until we have studied the matter much more intimately.

" Know the words of the Koran are simple,  
But within the outward sense is an inner secret one.  
Beneath that secret meaning is a third,  
Whereat the highest wit is dumbfounded.  
The fourth meaning has been seen by none  
Save God, the Incomparable and All-sufficient.  
Thus they go on, even to seven meanings, one by one,  
According to the saying of the Prophet, without doubt."

\* Cf. Paracelsus, *de viribus membrorum* (Hartmann, p. 219).—Moreover, each individual "is a member of the great organism of the world" . . . "not a separate being isolated from Nature." (Ib. p. 51). Individual: human world: one leucocyte: one human being.

"I know," said Tawaddud, the lady most learned, "the sublime Koran by heart and have read it according to the seven, the ten, and the fourteen modes" (438th Arabian night).

Therefore, to draw a lesson for our study out of these indications, we shall see that the aim in view is to formulate a person's constitution out of a number of components, none of which must be omitted from the series. To express the whole picture many modern aspects must be studied—histological, biochemical, psychological, without neglecting factors (metaphysical, etc.) accepted by the ancients but almost forgotten to-day. For instance, the past events in the ancestral history of the patient must be included, and all the factors coming into play even from the time of quickening may not be overlooked.

The insight afforded by the true conception of the nature of the human being in this way leads us on to an understanding of individual constitutions which should be amply satisfactory.

(c) *The doctrine of "the breath."*

§ 28. This subject is discussed in the course of the text (§ 136). The term "breath" found in Eastern writings is taken as the *exact* equivalent of Avicenna's conception, and is understood properly only when the "elements" are understood (see § 73).

Equivalent terms: life-principle; *ḥayat*; حَيَاة; the breath of life; *virtus vitalis*; *spiritus*; vitality; *Hu* (in Persian mysticism\*); *Ch'i* 氣; *nafas* (also used for "soul," "individuality").

It may be conceded that many of these words are used synonymously with much confusion in consequence. Thus the old doctrine of vitalism, supported by vitalists, is not the antithesis of, but strictly speaking, another form of rationalism. In Paracelsus we read "the first matter of the elements is nothing else than life. . . . The soul of the elements is the life of all created things. . . . There is again a difference between the soul and the life. Fire if it lives, burns. But if it be in its soul, that is, in its element, it lacks all power of burning" (*Opera* ii. 264). Errors of this kind are avoided by a careful study of the scholastic philosophy.

(d) *The doctrine of "the elements."*

§ 29. This is fully entered into at the end of the corresponding chapter in the translation (§ 55—108).

The conception of the universe in terms of four, or five, elements has been found among all peoples. To argue in favour of the doctrine almost compels an attempt at harmonization of its different forms (Aristotelian, Indian, Persian, Chinese, for instance). Suppose a number of people each set out to paint one certain landscape; that each is of different nationality; that each is restricted to a certain limited number of pigments; that each is a true artist. The final picture presented by each will be striking and inspiring. But it would be out of place to begin and compare stick with stick and stone with stone. If we understand, we shall learn—from each. The modern futurist may excite ridicule in his attempts to depict a landscape in terms of psychic forces, which he claims to discern, but to the mind of a student

\* *Hu*, in Chinese, 呼, is not the exact equivalent, though being used more for the act of expiration—unless there is a mystical sense attached to the term.

his work would have a different effect. These varying forms of one conception are amenable to intelligent understanding. (Cf. note to 20.)

§ 30. Carus<sup>15</sup> (p. 34) writes : "An explanation of the universe which derives all distinctions between things, conditions, relations, etc., from differences of mixture must have appeared very plausible to the ancient sages . . . even to-day Western scientists of reputation attempt to explain the universe as a congeries of force-centres, acting either by attraction or repulsion in analogy to positive and negative electricity. On the ground of this fact the educated Chinese insist with more than a mere semblance of truth that the underlying idea of the Chinese world-conception is fully borne out and justified by the results of Western science." Elsewhere the intimacy, in fact unity, between this philosophy and everyday life (Forke,<sup>23</sup> pp. 239, 269) is referred to as the justification for so often quoting Chinese thought in expounding Avicenna.

*B. Conceptions known to modern medicine ; but not to Avicenna.*

§ 31. Among the most important of these are :

(a) the anatomy of the circulation of the blood. (b) the rate of that circulation. (c) The details found in Quain's anatomy ; the microscopic anatomy ; such complexities as form the theme of Bayliss' Physiology. These details might be expressed as those of "the mechanics of the body." (d) Interactions in the tissues : chemical and cellular metabolism. (e) In *pathology*—the microbic theory ; the endless and always increasing number of "diseases" ; the laboratory diagnosis of dysfunction of organs ; (albuminuria was, of course, unknown) ; symptoms as evidences of disordered reflexes. (f) In *treatment* : the use of antisera and specific anti-substances of organisms ; hypodermic medication ; complex drug treatment has passed out of vogue. Surgery.

§ 32. Considerations which suggest that these instances of ignorance are not as grave as is supposed, and do not invalidate the standing of ancient medicine in regard to actual practice :—

*Ad (a).* Circulation of a kind was propounded in the case of the "breath," the elements, and the body-fluids, though not along anatomical channels. The Chinese recognized a process of "revolution," a succession of cyclical changes, an ebb and flow. Indeed, it is suggested in Duhalde<sup>20</sup> (p. 184) that the Chinese knew of the circulation of the blood itself some hundred years B.C.

Wieger (p.309, on Su-Wên), discussing whether the Chinese knew of the circulation of the blood twenty centuries before Harvey or not, decides truly that "their knowledge of the circulation of the blood in the human microcosm was intuitive, not experimental, conjectured in imitation of the circulation of the vital principle in the universal microcosm, in which they believed. They guessed the fact, and they never verified it. . . . During more than twenty centuries, the *how* of the guessed circulation never worried their mind. The yin-yang circulates in a ring, the five agents do the same, the blood the same. That is all . . ."

*Ad (b).* The rapidity of the changes was certainly not realized. The Chinese apparently believed that the circulation was completed only fifty times in one day (there is however room for fallacious translation).

Lest there should be over-satisfaction with ourselves, it may be suggested that the rapidity of the movement of the *lymph* was not realized before about 1908,

\* But if a doctrine which is common to Taoism and esotericism (that of microcosm and macrocosm) is allowed to be valid, the words "intuitive knowledge" cannot be made synonymous with "conjecture," "guess."

and is perhaps not fully realized by many practitioners to-day ; the rapidity of passage of food-materials down the small intestine was not known till the advent of the " bismuth " meal. The circulation of bacteria (cf. Arch. Exp. Med., 1923, 33) is not realised ; the existence of a circulation of nerve-impulses is not yet admitted.

*Ad (c).* The *capillaries* of the liver are referred to in **83** ; in the body in general in **85**. True, what Avicenna calls capillaries are larger than those we see with the microscope. But he knew that the blood passes from large trunks into the liver, traverses " capillaries " in the liver, and re-emerges by large trunks.

*Ad (d).* Interactions in the tissues were conceived of as taking place with an ebb and a flow (which is correct) ; lymph exudes into the tissue-spaces. Interactions take a considerable time (true). Digestion goes on within the blood-vessels in various parts of the body.

*Ad (e).* " Fermentation " was the counterpart of bacterial growth as we know it. The term is used sufficiently specifically in the text (e.g. **78, 79**). Diseases were regarded chiefly as parts of a *process* ; and there were but few processes (which is quite true : nine processes : see § 172). Urinalysis was carried out in order to assess the functional state of the liver (**605**).

§ 33. *Ad (f).* Modern medicine claims its title to superiority by its successes, and judges the medicine of the past by its failures.\* But what would the judgment be if this method were reversed ? Suppose we accepted the verdict of those among the laity—not so few—who are dissatisfied with their experiences of orthodox medicine and have turned to the " unqualified " of one kind or another ? or those of other countries who prefer their native doctors still ? or even those Europeans who have experienced triumphant success from native doctors, after modern methods had failed ? After all, the ancient medicine is still practised from Cairo to Calcutta, and a medicine not very different holds sway through the Far East. The late Sir Charles Pardy Lukis (Ind. Med. Services) is quoted as saying " Many of the empirical methods of treatment adopted by hakims are of the greatest value, and there is no doubt whatever that their ancestors, ages ago, knew many things which are nowadays being brought forward as new discoveries (Ayurveda, 1924, 2, i. 1).

Drug-treatment.—The complexity of prescriptions of former times has given place to simple and short ones, and the tendency is to discard them altogether. But the reasons for the ancient method are given in the Canon, and Avicenna's choice of remedies depended on a careful consideration of the constitution of the remedies, as well as of the patient and his idiosyncrasies. Thus, certain ingredients would be allowed or disallowed in a given standard confection according to the nature of the particular patient. " The presence or absence, and the amount, of nardus, ginger, fennel-seed, anise,

\* In his address, " Medicine and the Church," already referred to, Sir Farquhar Buzzard<sup>103</sup> says, " During more than 5,000 years the claim of those who practised medicine was to cure their patients of disease . . . we have gradually realized that no claim of that kind can be maintained . . . we make no claim to cure, either during the heat of battle or after victory has been won, should that be the result." This " modest standpoint " can surely hardly be said to be really general ?

piper, cyperus rotundus, must be according to the season, and the age of the patient " <sup>89</sup> (p. 91).

§ 34. Hartmann<sup>28</sup> (*Chinesische Heilmethoden*, Münch, Med. Woch., 1927, June 3rd, 935) describes the accuracy of native diagnosis (from the pulse, § 204) as "disconcerting,"\* and describes certain forms of treatment (auto-chemotherapy, Bier treatment) as being practised in a manner only different in outward appearance from the technique which we pride ourselves as being absolutely the "latest." "No wonder," he says, "that the Chinese are proud of their art, considering how long they have known that which we have only recently discovered."†

§ 35. The cynical mind cannot be upheld which passes off the reputed successes during the Middle Ages as coincidences, and overlooks the modern crowded out-patient departments as evidences of the limitations of our current therapy and theory; nor can the sceptic be much noticed who denies miraculous cures rather than admit scientific theories to be in any sense inadequate.

§ 36. Nevertheless, it is obvious that the principles of the Canon could not be taught over a hospital bed or in the out-patient department. It is true that they cannot cater for the wholesale requirements of the hospital or clinic. It should be clear to the candid that our modern technique does not avail for 100 per cent. of cases; for those who do not benefit at least an experiment with other systems of treatment should not be denied. If the fault is laid at the feet of over-strenuous routine work, the more leisured may yet find an advantage in a system which puts the details of a person's constitution in all its aspects into the forefront, where there is no question of teaching it either to classes or even to possibly indifferent individuals. The words of Paracelsus may be recalled, where he says: "the doctor who loves his art does not undertake twenty cases but five, knowing that no one person can conscientiously treat more than a certain number. No one person could ever make the whole world sound."

*C. Knowledge common to Avicenna and Modern Medicine.*

§ 37. A perusal of the text of the Canon will show many passages which apply quite well, without explanation, in these days. Thus, the following may be specified: the close relation between emotions and physiological states (shown to be even closer than modern research has realized).—The classification of people into sanguine, phlegmatic, bilious, saturnine, frigid, "hot."—The physiology of sleep, and how posture may remedy insomnia.—

\* The same wonder at their practice is recorded in A.D. 1253, when the friar William of Rubuck visited their country.

† These words can be fully endorsed, if only from a study of the Chinese classic on the pulse\*\* (80 volumes), discussed under the heading of "The Pulse" in the present treatise (§ 208). Among other ancient Chinese medical works (first seen by the present writer in the very extensive collection in the Library of McGill University, Montreal) reference may be made to the astonishing accuracy of representations of medicinal and other plants, and the almost dramatic representations of various diseased states in the *I tsung chin ch'un* by Hung Chou—extant in Avicenna's time. This work was reprinted between 1904 and 1924, and an older edition is in the Library of the School of Oriental Studies (London Institution).

Choice of location for dwellings.—The choice of a good drinking-water.—Health resorts. Climatic influences on health and illness.—Plethoric maladies.—Dietetics.—Hydrotherapy.—Regiminal treatment.—The uses of counter-irritation.—Bier treatment.—The introduction of remedies into the urethra.—The use of vaginal tampons.—The use of anæsthetics by the mouth (medicated wines : scopolamine !).—Testing the strength of a drug by animal experiment (Vol. 5).—The treatment of insanity by malaria (228).—The following paragraphs are interesting among many others : 106, 115, 255.

No doubt the great difference between the ancient and modern is one of outlook, which accounts for the difference of *topic*. That which appeared interesting and even important in those days is passed over by modern physiology and pathology. Each century has its own interests. The mistake made is to suppose that the older interests were "wrong," "incorrect," "useless"; and to label them as "out of date." True, fashions of all kinds come to be out of date, but the epithets "right," "wrong" do not apply. The more carefully we observe modern science the more evident does it become that just its terminology and subject of conversation is different. Things are seen from new angles, and things only surmised at then are amenable to tangible description now.

In fact, there occur moments, even at this day, when suggestive thoughts might be drawn from the Canon, to help in studying the individual, tedious, or baffling case, especially where the practice is far distant from the laboratories and appliances of modern medicine.

## V

### OF INTEREST TO THE SCHOLAR.

§ 38. The present translation is based on the Latin versions published at Venice in 1608 and 1595, supported by a study of the Arabic edition printed at Rome in 1593 and the Bulaq edition.

It is true that as E. G. Browne<sup>6</sup> (p. 34) pointed out, "the Latin Qanun swarms with barbarous words which are not merely transcriptions, but in many cases almost unrecognisable mistranscriptions of Arabic originals," and that Hirschberg and Lippert<sup>80</sup> regard the Latin as almost unintelligible, though they admit the "slavish adherence" of the Latin to the Arabic. Campbell<sup>12</sup> (p. 139) states that there was a "society of translators" at Toledo, about 1130 A.D., "whose method of translating from Arabic to Latin was to put the Latin equivalent over the Arabic words, disregarding the sense of the original." It is true that in many passages the obscurity is similar to the effect which would result if one were at this day to render idiomatic French word for word into English.

It is important to point out that the Latin of Volume I is very different from that of Vols. III-V; so different that the translation must have been the work of different persons. While the criticisms are justified with regard to these three volumes, they do not apply to

the first, whose Latin is very close to the Arabic, and hardly to be improved. The difficulty really is that the Arabic itself is so condensed that the meaning can only be clearly represented in English by the use of many more words, whether to help out the meaning itself, or to make a presentable reading.

It may well be said, as did E. G. Browne<sup>6</sup> (p. 26, 27): "he who judges Arabian Medicine only by the Latin translation will inevitably under-value it and do it a great injustice. Indeed it is difficult to resist the conclusion that many passages in the Latin version of the Qanun of Avicenna were misunderstood or not understood at all by the translator, and consequently can never have conveyed a clear idea to the reader."

§ 39. The following aids to clearness have been utilized. (a) The study of Avicenna's other works, and of contemporary philosophical writings, in the existing translations. (b) The study of various Latin terms as understood by modern scholastic philosophy in its exposition of the mediæval nomenclature. (c) The use of modern terms when there is no reasonable doubt of their referring to the same idea, though the literal term in the Latin is obsolete. The careful study of the original Arabic has here been of special importance, for words in the Latin version, which are evidently technical there, become merely colloquial when translated into English, whereas in the Arabic version, such words at once take on their proper character in the Arabic-English and Persian-English dictionaries. (d) The use of tabulation of the matter. There are instances where this proves possible without omitting even a single Arabic word. (e) The use of paraphrase for certain passages. These are marked (p). A certain freedom of rendering has been inevitable in view of the importance of bringing the *full* meaning of the text to the reader's notice without subjecting him to the need of reflecting deeply on passage after passage—as is requisite with the original Arabic.\*

## VI

§ 40. The main purpose of this treatise will now be seen to centre in the idea that in the ancient philosophy there is material capable of useful application to-day. The selection of the work of Avicenna is not intended to provide an apologium for that one author, but is specially appropriate for these reasons: (i) his acknowledged excellence; (ii) his greater accessibility among mediæval medical writings; (iii) a certain indefinable charm of expression peculiar to himself. But above all, (iv) the fact that his central theme is a conception of the nature of the human being really identical with that of Thomistic philosophy, and in these days specially stressed and developed by "modern scholastic philosophy." As these are related, so might Avicenna be related to a modern

\* To have dealt with the work from the point of literature would have entailed giving the preference to safeguarding against likely criticisms at the hands of pure scholarship.

scholastic medicine, which would aim at reasons for health and ill-health far deeper than those given by the microbic and cognate theories.

With Mercier<sup>56</sup> "we do not regard the Thomistic philosophy . . . as a boundary which sets limits to personal activity of thought . . . but make use of his" (in this case, Avicenna's) "teaching as a starting-point from which we may go further afield" (footnote, p. 31).

With Maher<sup>50</sup> we ". . . resuscitate and" (apply to Medicine) ". . . a psychology that has already survived four and twenty centuries, and has had more influence on human thought and human language than all other psychologies together. My desire, however, has been not merely to expound, but to expand this old system . . . to make clear to the student of modern thought that this ancient psychology" (and Medicine) "is not so absurd, nor these old thinkers as foolish, as current caricatures of their teaching would lead one to imagine. . . . To trespass (on the soul) . . . is assumed by (many writers) to be the gravest of professional delinquencies."

§ 41. Therefore Avicenna is allowed once more to present his theme. To the questions we are constrained to ask of him, we find our answers (1) in his other writings; (2) in contemporary literature; (3) in the writings of modern Eastern thinkers; (4) in the works of S. Thomas; (5) in modern scholastic philosophy. If some truths are crudely expressed or perhaps faultily explained, it is our privilege to re-express and re-explain with those aids.

§ 42. Those who may have failed to identify one single Truth under different garbs are not obliged to accord these garbs an unfriendly reception upon the stage of our modern world. To recall a favourite Indian metaphor, the danseuse has so robed herself, and displays such diversities of art that under the ever-changing coloured beams of light it is difficult to believe there can be only one and the same artiste before us. Should it prove impossible to verify this, at least the very exhibition of the art should serve so to refresh that we can resume our work and ambitions with an added zest—now confident that the future realization of our desires is not so intangible as at first appeared.

"I deemed life was tranquillity and rest,  
I find it but a never-ending quest;  
And I, who sat in quietude and peace,  
Toil on a journey that shall never cease." (Shamshad.<sup>29</sup>)

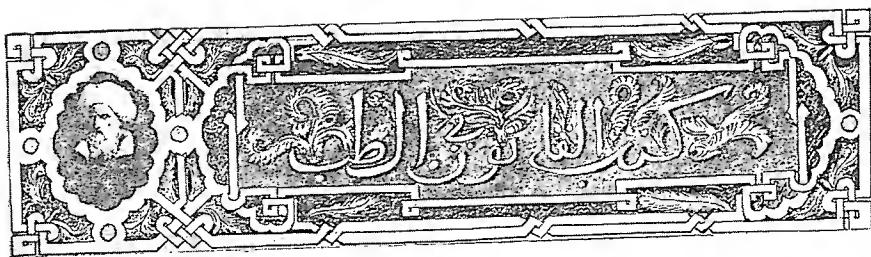
"Why should the Cosmos turn its wheel of worlds  
If not to search for Thee eternally?  
Why should the tireless Sun arise each morn  
If not to look for Thee?" (Zauq.<sup>29</sup>)

"How can I win that Hidden One Who sits within the secret place,  
For even in my very dreams She wears the veil upon Her face." (Jurat.<sup>29</sup>)

"For long, throughout the world, I sought for Thee,  
Through weary years and ages of unrest;  
At last I found Thee hidden in my arms  
Within my breast!" (Zauq.<sup>29</sup>)

§ 43. That which is spread before us, beneath the unceasing surge and change of the crowded life of the thoroughfares of great cities, as well as beneath the panorama of Nature herself, was surely understood by those who insisted "there is no second Cause," and by Chu Hsi<sup>11</sup> in saying "the innumerable laws (of Nature) all proceed from one source" (p. 137). In this the thought is not pietistically of a Creator, but of a living Reality met (passively or receptively) or encountered (actively or contestingly) by us all at all times. That Reality must be understood before we handle the problem of our patient with real efficacy.

§ 44. In the intention of this work, then, there comes into consideration that greater Art of Medicine—not an ethical Hippocratic ideal, but something of the divine—an Art as real to Avicenna, philosopher, poet, musician, the worker among the great and the small, aware of the dramatic in Life, as it should be to us. So we step out of the world of the modern critic, the scholar, and the medical historian, indeed of modern medicine itself, into one in which we stand, as it were, hand in hand, with the great Master of the East—almost with his very eyes gazing upon and scrutinising this ever open book of Life of ours—divested of the false notions of "progress" and "time." His language is thus no longer alien—and, incidentally, he lives again!



## Introductory Words

**I**N the first place we render thanks to Allah, for the very excellence of the order of His creation, and the abundance of His benefits. His mercies are upon all the prophets.

2. In the next place, I may say that it is at the request of one of my very special friends,\* one whom I feel most bound to consider, that I prepare this book on Medicine, setting forth its general and particular laws to the full extent necessary, and yet with apt brevity.

3. My plan is to deal with the general aspects of each of the two divisions of medicine—the speculative and the practical. Then I shall treat of the general principles applicable to the diagnosis of the properties of the simples, following this with a detailed account of them. Then I shall take up the disorders which befall each individual member, beginning with an account of its anatomy, and that of its auxiliary. The anatomy of the several members and their auxiliaries is dealt with in the first book. Having completed the account of the anatomy, I shall show how the health of the member is to be maintained.

4. This subject being completed, I proceed to a general discourse about general diseases—their causes, the signs by which they are recognized, and the modes of treatment. After this, I pass on to the special diseases and will point out in as many cases as possible—(i) the general diagnosis of their characters, causes and signs, (ii) the special diagnostic features,

\* Was it Al-Jūzjāni? (cf. E. G. Browne,<sup>7</sup> p. 157).

The portrait in the heading reproduces a painting in oils hanging in an ante-hall of the Seville University.

The designs in this and many other headings through this work are adapted from or copied from, Arabic and Persian sources. For others, taken from manuscripts, etc., the author is indebted to the kindness of Messrs. Luzac & Co. Initial letters are taken from the 1608 edition in Latin, the 1523 edition of Haly Abbas, and various mediæval illuminated books.

(iii) the general rules of treatment, (iv) the special methods of treatment by (a) simples, (b) compounded medicines.

I include specially designed tables under the subject of simples to enable you to survey the facts rapidly as to the adjuvants for treating disease by simples.

Compounded medicines, and their adjuvants, and how to mix them I have deemed it best to consider separately in a "Formulary." This it is my intention to compose after the special subjects are dealt with. Disorders not confined to one member are described in this book ; the cosmetics are spoken of ; and the knowledge set forth in previous books is assumed. Allah helping me to complete this volume, the formulary will be added to it.

5. Every follower of my teachings who wishes to use them profitably should memorize most of this work, even though he do not quite understand it all.

It is my intention to prepare further volumes if Allah should prolong my life still further, and if circumstances prove propitious.

#### SCHEME OF CONTENTS

- Book I. General matters relative to the science of medicine.
1. The definition and scope of medicine. Health.
  2. The classification of diseases ; their general causes and symptoms.
  3. The preservation of health and regiminal treatment.
  4. The classification of the modes of treatment in general.
- Book II. *Materia medica*.
- Book III. Special " pathology " (Medical and Surgical).
- Book IV. Special diseases involving more than one member.  
The cosmetic art.
- Book V. Formulary.

#### CONTENTS OF BOOK I\*

PART 1 comprises six theses :—

1. The definition of medicine. The topics of medicine.
2. The imponderable elements.
3. The temperaments and constitutions.
4. The fluids of the body, and how they arise.
5. The members (bones, muscles, nerves, arteries, veins) (= tissues and organs).
6. The faculties of the body : vegetative, sensitive, vital. The power of locomotion. The functions and operations of the body.

PART 2 comprises three theses :—

1. Ill-health :
  - (a) Causes, symptoms.
  - (b) States of the body ; types of disease.
  - (c) Disorders of configuration.

\* The Latin text is abridged here.

- (d) Loss of continuity.
  - (e) Diseases of the composition.
  - (f) Disfigurements.
  - (g) The phases or cycles of disease.
  - 2. The causes of disease :
    - (a) Atmospheric, seasonal, winds, localities ; the sun.
    - (b) Vegetative functions.
    - (c) Food and drink.
    - (d) Other factors.
    - (e) Enumeration of the causes of each of the corporeal conditions.
  - 3. The evidences of ill-health in (a) the pulse, (b) the urine, (c) the fæces.
- PART 3 comprises five theses :—
- 1. Nutrition. Regimen from birth to childhood.
  - 2. Regimen from childhood to old age ; Exercise, gymnastics, bathing, dietetics, fatigue.
  - 3. Regimen for the aged.
  - 4. Regimen appropriate to the various constitutions and habits of body.
  - 5. Seasons.
- An epitome giving the regimen in special circumstances of life.
- PART 4. The treatment of disease.
- (There are 263 chapters in all.)



" In the name of Allah, the Merciful, the Clement."

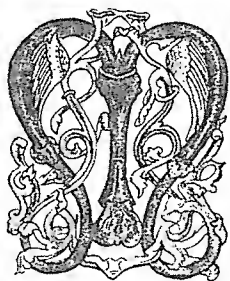
## BOOK I

" Whoever has mastered the first book of the Qanun, to him nothing will be hidden of the general and fundamental principles of medicine."—*Chahar Maqala.*"

### Part I

#### THESIS I

##### I. THE DEFINITION OF " MEDICINE "



EDICINE (6) is the science by which we learn, (a) the various states of the human body, (i) in health, (ii) when not in health, (b) the means by which, (i) health is likely to be lost, and (ii) when lost, is likely to be restored to health. In other words, it is the art whereby health [the beauty of the body—long hair, clear complexion, fragrance and form (Chahar Maqala)] is conserved and the art whereby it is restored, after being lost.

7. Although some divide " medicine " into a speculative (theoretical) and a practical (applied) part, you have assumed that it is wholly speculative " because " you say " it is pure science." But truly every science has both a speculative and a practical aspect. Philosophy has a speculative and a practical side. So has medicine. The difference between the two need be explained only in the case of medicine. Thus—

When, in regard to medicine, we say that practice proceeds from theory, we do not mean that there is one division of medicine by which we know, and another, distinct therefrom, by which we act. We mean that these two aspects belong together—one deals with the basic principles of knowledge ; the other with the mode of operation of these principles (within the body). The former is theory ; the latter is applied knowledge.

8. "Theory" of medicine is that which, when mastered, gives us a certain kind of knowledge, apart from any question of treatment. Thus we say that "there are three forms of fever and nine constitutions."

9. "Practice" of medicine is not the work which the physician carries out, but is that branch of medical knowledge which, when acquired, enables one to form an opinion upon which to base the proper plan of treatment. Thus it is said : "for inflammatory foci, the first agents to employ are infrigidants, inspissants, and repellants ; then we temper these with mollificants ; and, finally, when the process is subsiding, resolvent mollificants will accomplish the rest. But if the diseased focus contains matter which depends for its expulsion on the integrity of the principal members, such treatment is not applicable. Here the theory guides to an opinion, and the opinion is the basis of treatment.

Once the purpose of each aspect of medicine is understood, you can become skilled in both, even though there should never come a call for you to exercise your knowledge.

10. Another thing—there is no need to assert that "there are three states of the human body—sickness, health, and a state which is neither health nor disease." The first two cover everything. Careful consideration of the subject will make it clear to the physician either that the threefold grouping is unnecessary or that the group which we reject is unnecessary.

The first two states really cover everything. Careful consideration will convince the physician that the third state is dual—on the one hand an infirmity, and on the other a habit of body [some ugliness of form, for instance] or a condition which cannot be called strict health although the actions and functions of the body are normal. One must not risk defining "health" in an arbitrary fashion, and include in it a condition which does not belong to it (*p*).

However we do not propose to argue this matter out, because a disputation of that kind does not really further medicine.

§ 45. Joannitius<sup>11</sup>, Hunayn ibn Ishāqal-'Ibādi (E. G. Browne<sup>7</sup>, p. 147)—defines Medicine as "the science which informs us about the states of the human body in health, or when it deviates from health; how to retain health; how to regain it."

It is concerned with the following:—

1. That which is integral in the *nature* of the human being. The seven "notes" of the healthy human being—four being material, essential, and three formal. The four "accidental" notes.
2. That which is apart from the *nature* of the human being.
3. The præternatural or abnormal, to which belong the diseases, their causes and signs.



§ 46. THE SCOPE AND DEFINITION OF MEDICINE AS A PROFESSION; the motives underlying.

#### I. MEDICINE AS AN EXTERIOR LIFE OR CAREER.

(a) *The pursuit of a science.* Medicine may be taken up as a science in itself, for the sake of science—namely, "that science which treats of the prevention or cure of disease." . . . This work entails the study of cognate sciences. Love of knowledge may be the chief motive; that is, it is an intellectual pursuit; though other motives may be associated.

Many branches of medical science are separated off as distinct pursuits—external, internal, state, psychological, pathological, legal, medicine, etc. As a Career, it may be orthodox, that is obedient to the laws about practice, etc.; in which case it is also obedient solely to the microbic theory of disease—or unorthodox in various degrees, through following different "systems," many of which are unauthorized, and lead to some form of illegal practice.

If Medicine be regarded as concerned with the nature and constitution of man (as a matter of the first importance in learning how to maintain health and alleviate the distresses of ill-health), it is defined virtually in the same way as Avicenna, and conforms also to modern scholastic philosophy. In this case the practitioner would centre his attention on the individual, the patient himself, rather than on some disease or infection, or over and above the disease or infection; the constitution being primary in causation.

(b) *The pursuit of a practical art.* The scientific aspect is here made subsidiary to practical utility and success.

(i) In its primary motive, this form of pursuit is of course the pursuit of a livelihood, and medicine is a form of commercial life. Its success would then be measured by the bank balance. Admittedly this is seldom of the degree called wealth. After a long life of hard work, such a one might grieve at his lack of success did he not simultaneously have motive (ii). For these words then apply: "The only compensation which medicine offers to wealth is the spiritual pleasure of sacrifice, that solemn sweetness which floods our being when we see the fruit of our pain. The dependence of the soul on the Creator, brings our obligation to Him in dealing with those under our care. This is what makes the weary dispensary clinic blossom with a fullness of solace surpassing all expectations" (Flagg.<sup>23</sup>)

(ii) Pursuit primarily for humanitarian motives—the alleviation of suffering, especially of physical pain; and of various disabilities. (The actual cure of disease is often supposed to be within human scope, though an impartial judgment must surely modify such an idea.) Preventive medicine is based on the same motives.

#### § 47. 2. MEDICINE AS AN INTERIOR LIFE. Motives in the strict sense.

(a) "*Worldly motives*"—pursuit as a means of satisfying a certain egoism or ambition on the part of the doctor himself or of his relations; pursuit as a trade or business.

(b) *As a form of devotion to Fellow-man.* Philanthropy. (i) The relief of pain, disability, suffering, etc. (ii) Socio-political motives—the efforts of legislation and research: sanitary medicine; state medicine. Industrial medicine. Organization of "team" work both for research and the "panel." The devotion is more to

Man in the abstract, the individual not receiving personal contact, as he does under (i).

(c) *As a form of devotion to God.*

(i) The study of medicine may be made the means of studying God both in Nature and in Man, and indeed in all Life, to perceive the purpose of God therein.

(ii) The pursuit of practice (a) as a penance or means of mortification "in the cell of your heart." So, Avicenna the Sufi seeing through the Quran how daily life is a disciplinary (Massignon, <sup>33</sup> ii. 515). (b) A means of reaching personal perfection. "Every soul is on the way to sanctification, after all, and God leads each according to the means He selects as best" (Tanquary, <sup>34</sup> p. 976). This is the practitioner's "unitive way." To achieve one single act in the whole life would be to achieve the desire. (c) A means of realization of the love of God. "The fear of the Lord is the beginning of wisdom" (Medicine as a "religious life" being capable of inclusion under this title)—culminating, not through personal will, but through divine will, in a consciousness of the presence of God throughout every organ and tissue, so that the state ("Hal") of recollection may finally become actual. (d) A means of expiation. It is possible that expiation may be accomplished through the instrumentality of the physician, and without his being aware of the fact. He may be the instrument whereby the patient is released from illnesses arising from causes indicated in § 199. On the other hand, he may fulfil a deeper intention, especially when both skill and devotion are great, for in him the devotion of God to man may become capable of expression,—he may become the vehicle of God's intention. As the master virtuoso is just one voice of God heard from among the sea of musicians, and is only able actually to utter one or two of the voices of thousands of composers in his recital, so also is the utterance of that expiation rare and restricted. One wave alone comes into prominence and then breaks, but it is with thorough purpose, not at random. Even so, God, in that wave, may wish to express Himself in that manner if only once and through one individual in one generation.

§ 48. This, the highest aim of the pursuit of medicine as an art receives a dual reward: the subtle intangible but far-reaching influence upon the patients, benefiting them unknowingly; the influence upon the physician by the spirit of divine love whereby is imparted the gift of *insight* into the realms of absolute realities—into that which underlies deeply the appearances of this kaleidoscopic world; the gift of *ability to counsel* the patients along the road of their own life, whereby those for whom this counsel is intended shall proceed towards the common goal of Man. Neither physician nor patient may be conscious of this gift. Yet the former may recognize in the illnesses or persistent ill-health some *decree*, some divine purpose related to that particular soul, which it may be for the physician to intervene or not, whether he perceives the holy ground on which that patient momentarily stands or not. No treatment will cure till the expiation is accomplished.

To the despondent and over-tired and weary practitioner, these motives reveal the same life and vision of Paradise as belonged to the author of the Canon; once viewed, its warmth and happiness may still accompany him as he resumes his daily round, and thereafter his enforced departure upon the tasks of the day need evoke no sigh of regret.

As Ibnu 'l-Farid (A.D. 1182-1235) reveals in his *Ta'iyya*<sup>32</sup> (p. 180), there is the power of lifting oneself into the sphere of the infinite and eternal, whereby the daily task becomes transformed "all breathing human passion far above."

§ 49. In these days, mass-production of all kinds, and in great cities. In those days, individual craftsmanship and artistry in secluded places. In these days, the organization of modern medicine for wholesale achievement in all its departments; team-workers and the rush of the highways, with a certain scorn for the isolated. In those days, a placid and leisurely solitude, in which could be attained a quiet seership of Life.

In thought, we of this day may step aside from the rush of the highways and lanes, and in our wayfaring find ourselves back in those times, meeting with a solitary and forgotten seer, stay quietly awhile with him, and through him gain a glimpse of Something which nothing else can reveal, Whose very truth is abiding and irresistible.



## 2. THE SUBJECT-MATTER OF MEDICINE

11. To medicine pertains the (study of the) human body—how its health is maintained; how it loses health. To know fully about each of these we must ascertain the causes of both health and sickness.

12. Now as health and sickness and their causes are sometimes evident to the senses and sometimes only perceived by means of the evidence afforded by the various symptoms, we must in medicine gain a knowledge of the symptoms of health and sickness.

It is a dictum of the exact sciences that knowledge of a thing is attained only through a knowledge of the causes and the origins of the causes—assuming there to be causes and origins. Consequently our knowledge (of health and sickness) cannot be complete without an understanding both of symptoms and of the principles of being.

*Symptoms*: the word includes our modern “signs” and “symptoms.” *Principles of being*: this is the topic of scholastic metaphysics. *Only through a knowledge of causes*:—compare the following:—

“It is impossible to know a thing perfectly unless we know its operation; since from the mode and species of its operation we gauge the measure and quality of its power, while the power of a thing shows forth its nature: because a thing has naturally an aptitude for work according as it actually has such and such a nature.

“Now the operation of a thing is twofold, as the Philosopher teaches (9 Metaph., D.8, viii. 9); one that abides in the very worker and is a perfection of the worker himself, such as to sense, to understand, and to will; and another that passes into an outward thing, and is a perfection of the thing made, that results from it, such as to heat, to cut and to build.” (*Contra Gent.*<sup>81</sup>, ii. 1).

13. There are four kinds of “cause” (of health and sickness):—

1. The *material cause*—namely, the human subject in a state of health or disease. The immediate subject is: the members and the breath. The more remote is: the humours. The most remote is: the (imponderable) “elements.” The humours and the elements are composites, and they are liable

to vary. But though they are subject to a variation of composition and change they show a certain constant unity, to which they converge—namely, a unity of “constitution,” or of “form.” The constitution is in relation to the “change”; whereas the “form” is related to the “composition.”

2. The *efficient causes* are such as change or maintain the states of the human body. Namely :—

Extrinsic : the air and affiliated agents :

localities, countries, habitable regions and the like :  
comestibles, potables, and the like.

Intrinsic : movement and its opposite—repose of body and mind ;  
including sleep and its opposite—the waking state ;  
evacuation of secretions and excretions ; and its opposite  
—retention thereof :

the changes at the different periods of life .

occupations ; habits and customs :

descent (race, nationality).

Agents affecting the human body by contact, whether contrary to nature or not.

3. The *formal causes* : the constitutions ; the compositions ; the faculties proceeding from the constitutions.

§ 50. Costaeus, the Annotator of the Canon (1608 ed.) passes on to speak of health as a “harmony of the composite, the formal cause of the human body.” Galen also defined temperament as the formal cause of the human body. It is exactly here that we find the issue between theology and rationalism, for the former defines the formal cause of the human being to be what is called “the rational soul.”

The refutation of the statements is adequately made by S. Thomas<sup>84</sup> (lxiii), thus :—

“Harmony cannot move a body or govern it, as neither can a temperament. A harmony and a temperament also admits of degrees. The notion of harmony rather befits qualities of the body than the soul ; thus health is a harmony of the humours ; strength is a harmony of muscles and bones ; beauty is a harmony of limb and colour. . . . Harmony may mean either the composition itself or the principle of composition. Now the soul is not a composition, because then every part of the soul would have to be the composition of the parts of the body. . . .” (I, p. 166).

Just as the mediæval physicians fell into the rationalistic error so ably and thoroughly exposed throughout the “*Contra Gentiles*,” when they “freed” themselves from stereotyped teaching, so with modern teaching.

The physical and chemical facts which were discovered in the nineteenth century appeared finally to controvert both the statements of the Canon and those of the scholastic metaphysicians ; but it is

gradually becoming clear to more and more thinkers that this is not the case.

4. The *final causes* : the actions or functions. A knowledge of these presupposes a knowledge of the faculties and the breaths (which are the subjects of the faculties) as we shall show.

14. These, then, are the subjects which pertain to medicine. Familiarity with them gives one *insight* into how the body is maintained in a state of health, and how it becomes ill. A full understanding of how health is conserved, or ill-health removed, depends on understanding the underlying causes of each of these states and of their "instruments." For example—the regimen in regard to food, drink, choice of climate, regulations regarding labour and repose, the use of medicines, operative interference.

Physicians treat of all these points under three headings, as will be referred to later—health, sickness, and a state intermediate between the two. But we say that the state which they call "intermediate" is not really a mean between the other two.

15. Now that we have enumerated these groups of causes (of health and sickness) we may proceed to discuss whatever Medicine has to say concerning (a) the elements ; (b) the constitutions ; (c) the fluids of the body ; (d) the tissues and organs—simple and composite ; (e) the breaths and their natural, sensitive and vital faculties ; (f) the functions ; (g) the states of the body—health, sickness, intermediate conditions ; and (h) their causes—food, drink, air, water, localities of residence, exercise, repose, age, sex, occupation, customs, race, evacuation, retention. The external accidents to which the body is exposed from without ; (i) the regimen in regard to food, drink, medicines ; exercises directed to preserving health ; (j) the treatment for each disorder.

16. With regard to some of these things there is nothing a physician can do, yet he should recognize what they are, and what is their essential nature—whether they are really existent or not. For a knowledge of some things, he depends on the doctor of physical science ; in the case of other things, knowledge is derived by inference [reasoning]. One must presuppose a knowledge of the accepted principles of the respective sciences of origins, in order to know whatever they are worthy of credence or not [criteriology] ; and one makes inferences from the other sciences which are logically antecedent to these. In this manner one passes up step by step until one reaches the very beginnings

of all knowledge—namely, pure philosophy; to wit, metaphysics.

Hence, if a doctor undertakes the proofs of the existence of the “elements” and the “constitutions” and their derivatives from medicine itself he errs, for medicine cannot make these things clear, belonging as they do to the domain of natural science.

§ 51. In regard to this last sentence note: “It is not the concern of physical science (incl. medicine: Tr.) to study this first origin of all things; that study belongs to the metaphysician, who deals with being in general and realities apart from motion” (Contra Gent. ii, c. xxxvii).

In reference to the same, note also the following passage by J. Rickaby, S.J., <sup>79</sup> (p. 103): “motions, molar and molecular, vibrations and transferences chemical, biological, mechanical or cosmic—are the subject-matter of the professor of physical science; but the Creator and the creative act are above motion . . . the range of physical science is narrower and lower than that of literature. . . . When a physicist pronounces on a religious question either for or against religion, he is *sutor supra crepidam*: he has overshot his subject. *Of course he ought to overshoot his subject.* . . . Wherever physical science becomes the staple of education, to the setting aside of Latin and Greek, it will be found necessary . . . in the interests of religion to insist upon a parallel course of metaphysics, psychology and ethics . . . trained on physical science without literature and philosophy, the mind suffers atrophy of the religious faculties, a disease which some seem anxious to induce upon mankind—a painful disease nevertheless, productive of much restlessness and irritability.”

17. List of what the physician aims at having a clear notion of; what each is, and whether the non-manifest actually exist or not.

1. The elements. Do they exist? How many are there? In what modes are they? What are they? How do they arise?
2. The temperaments and constitutions. What are they? How many are there?
3. The fluids of the body. Do they exist? How many are there?
4. The members and the sense-organs. [The science of anatomy.]
5. The faculties. Do they exist? How many are there?
6. The functions. [The science of physiology.]
7. The breaths. Do they exist? How many are there? Where are they? What changes in state do they undergo? What are the causes of retardation (lagging) of the breath?

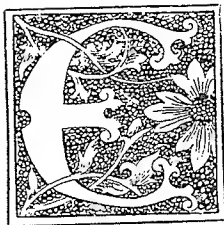
(Or : the changes in the affective faculties ; and the cause of their persistence.)

8. The causes. How many are there ?

18. The physician must also know how to arrive at conclusions concerning (1) the causes of illnesses and the individual signs thereof ; (2) the method (most likely to) remove the disorder and so restore health. Wherever they are obscure, he must be able to assign to them their duration, and recognize their phases.



## THESIS II. THE ELEMENTS



LEMENTS. 19. The elements are simple bodies. They are the primary components of the human being throughout all its parts, as well as of all other bodies in their varied and diverse forms. The various orders of beings depend for their existence on the intermixture of the elements.

Elements : Equiv. : cosmic elements ; imponderable elements ; primordial essences ; first-principles ; elementary principles ; grades of radiance.

It is important to note that these elements are *not* "matter," but have only a virtual existence, as explained more fully below (§ 73; 309).

"Formae elementorum sunt in mixto virtute, non actum motu."<sup>83</sup>  
(76. 4. 4. m.)

"I am in water, and earth, and fire, and air.

These four around me, yet of these four I am not."

(Shamsi Tabriz,<sup>68</sup> T. 235, 5, p. 220.)

A difference must therefore be observed between them and the literal earth, water, air and fire.

Each of the latter, it must be noted, contains all four elements, imponderable elements, the correspondingly named element being merely preponderant (cf. § 143).

Simple bodies.—That is, simple in the scholastic sense ; indivisible. "Simplicity is that quality in virtue of which a substance has neither constitutive nor quantitative parts" (Mercier,<sup>56</sup> ii. 523).

20. Natural philosophy speaks of four elements and no more. The physician must accept this. Two are light, and two are heavy. The lighter elements are Fire and Air ; the heavier are Earth and Water.

Four elements and no more.—In Chinese, Buddhist, and Ayurveda philosophy there are five. In theosophy also, a fifth, named "ether," is given. The alchemists gave three. Aristotle discussed a fifth saying "the heaven is not of the nature of the four elements, but is itself a fifth body, existing over and above these"—quoted by S. Thomas<sup>84</sup> (68. i. p. 218). These various statements are not actually mutually contradictory (cf. § 29).

Light : equivalents : weak, male (because conferring or inceptive), positive, active. Heaven.

Heavy : equivalents : strong, female (because recipient), negative, passive. Earth.

“ Heaven is man, and earth woman in character ;  
 . . . Whatever heaven sends it, earth cherishes.  
 When earth lacks heat, heaven sends heat ;  
 When it lacks moisture and dew, heaven sends them.”

(Mesnavi,<sup>57</sup> p. 161.)

**21. THE EARTH.** The Earth is an “ element ” normally situated at the centre of all existence (see scheme in § 54). In its nature it is at rest, and all others naturally tend towards it, at however great a distance away they might be. This is because of its intrinsic weight. It is cold and dry in nature, and it appears so to our senses as long as it is not interfered with by extraneous agencies, and obeys its own peculiar nature. It is by means of the earthy element that the parts of our body are fixed and held together into a compacted form ; by its means the outward form is maintained.

“ The Earth is the warp and weft of thy body.”—(Mesnavi,<sup>57</sup> p. 41.)

“ Earth ” is understood in respect of its principal property of dryness<sup>84</sup> (69, i. p. 234).

**22. THE WATER.** The Water is a simple substance whose position in nature is exterior to the (sphere of the) Earth, and interior to (that of) the Air. This position is owing to its relative density. In nature it is cold and moist. It appears so to our senses as long as there are no influences to counteract it. Its purpose in (the world of) creation lies in the fact that it lends itself readily to dispersion, and consequently assumes any shape without permanency. In the construction of things, then, it provides the possibility of their being moulded and spread out and attempered. Being moist, shapes can be readily fashioned (with it) and as easily lost (and resolved). Dryness, on the other hand, permits forms to be assumed only with difficulty, and they are resolved with similar difficulty. When dryness and moisture alternate, the former is overruled by the latter, and thus the object is easily susceptible of being moulded into a form ; whereas if the moisture were overruled by dryness, the form and features of the body would become firm and constant. Moisture serves to protect dryness from friability ; dryness prevents moisture from dispersing.

"Verily the likeness of this present life is no other than as *water* which we send down from heaven, and wherewith the produce of the earth is mixed, of which men eat, and cattle also, until the earth hath received its vesture and is adorned. The inhabitants thereof imagine that they had power over the same, but our command cometh unto it by night or by day, and we render it mown (as reaped seed-produce: Woking trans.), as though yesterday it had not abounded with fruits." Quran, x. 24. (p. 51, Gulshan<sup>25</sup>.)

Again, more specific still, Quran 18. 45. shows that Water enters into the plants, and *only as long as it is there do they live*. "The parable of the life of this world: like *water* which We send down from the cloud so the herbage of the earth becomes luxuriant on account of it": (Woking trans.) "min assama fa khatalatabihi . . ." mingled with—or, as one may paraphrase (cf. the sevenfold interpretation of the Quran): "water is the channel of life"; and note that the water came from the cloud, to which it was itself drawn by the solar heat!

"Water has especially a life-giving power, since many animals originated in water, and the seed of all animals is liquid. Also the life of the soul is given by the water of baptism"<sup>84</sup> (ib. 74, iii, p. 273). "Augustine holds 'water' to mean 'formless matter.'"

Water may be understood here in the sense of "radical moisture" (Paracelsus), which is absolutely essential to life, " $H_2O$ " being thus as it were an instrument or substrate. The plant cannot shoot out leaves, flowers and fruit without it; so man cannot thrive without this radical moisture, or innate moisture. Moreover, on this view, the moisture is conserved by a medium which has "material" humidity—a concept which brings us to the domain of chemistry.

The watery nature may be called "fluid nature"; pliability; living character.<sup>39</sup>

So, in the Chinese conception, Forke<sup>23</sup> (p. 271) explains, that the "fluid" of water is yang, and its substance yin; the fluid of earth is yang, and its "substance" yin; whereas the "fluid" of fire is Yin, and its "substance" Yang. Yin is here understood in a procreative sense, Yang in a destructive sense.

**23. THE AIR.** Air is a simple substance, whose position in nature is above the sphere of Water, and beneath that of Fire. This is due to its relative lightness. In nature it is hot and moist, according to the rule which we have given. Its effect, and value, in (the world of) creation is to rarefy, and render things finer, lighter, more delicate, softer, and consequently better able to move to the higher spheres.

See also under "atmospheric air" (264).

The air—"element," entering into the "breath," is that which enables us to stretch and contract, and also makes possible the involuntary movements throughout the body.<sup>38</sup>

## 24. THE (SPHERE OF THE) FIRE.

"Ignis est causa omnium ignitorum."—(St. T.,<sup>81</sup> iii. 46.)

Fire is a simple substance, which occupies a position in nature higher than that of the other three elements—namely the hollow of the sublunary world, for it reaches to the (world of the) heavens. All things return to it. This is because of its absolute lightness. In nature it is hot and dry. The part which it plays in the construction of things is that it matures, rarefies, refines, and intermingles with all things. Its penetrative power enables it to traverse the substance of the air; by this power it also subdues the sheer coldness of the two heavy cold elements; by this power it brings the elementary properties into harmony.

The difference between the "element" fire, and fire as usually understood is shown in describing flame, for instance, as "material" fire, and vesicants like cantharides, urtica, as "essential" fire. Or, as stated under "air," there is a "fluid" of fire and a "substance" of fire. Just as "water" is "radical" or "substantial," "material."

25. The two heavy elements enter more into the construction of the members (and fluids of the body, Costaeus), and contribute to repose. The two light elements enter more into the formation of the breaths and contribute to their movement as well as to the movement of the members—always remembering that it is the form that is the motor (and not the breath. The form initiates the breaths and through them moves the organs of the body and the limbs.) So much for the elements.

"Elementa subtiliora predominantur in mixto, secundum virtute; sed grossiora secundum quantitatem."—(Sum. Theol.,<sup>82</sup> 71, 1, 2m; 91, 1, c. 3m.)

Fire, Air, Aether; the nourishing flame which imparts heat, life, sense and intelligence" (xiv. 153).

§ 52. "It is the form that is the motor and not the breath."—In this sentence is contained the crux of the whole subject. "Form," used in the scholastic sense, has a subtly specific meaning when applied to the human being. This meaning is gone into in the accompanying exposition. Briefly, the form when associated with the solid, fluid, and gaseous components (earth, water, air) of the "body" is called a "living human being," and it accounts for the continual movement of the "breaths" (life-principle) which manifests to the onlooker that that human being really is living.

§ 53. Position in nature.—If the names of the elements are taken as synonymous with the corresponding words describing mundane nature, it is evident that earth (land) is higher than "water"; and that "air" is above both. The fire (solar heat) is above all. But mystically speaking there is such a relation apart from the geographical one.

§ 54. In the following scheme the classification of "worlds" is set out according to the various schools of thought (Koranic, Persian, Ptolemaic, etc.) prevailing in the middle ages. The literal discrepancies are simply due to the standpoint having been taken differently—sometimes theological, sometimes philosophical, sometimes scientific—by the several schools of thought.

# SCHEME OF THE POSITION OF THE SEVERAL "WORLDS" AS CONCEIVED BY THE ANCIENTS.

The Vacuum. Al-Khala; la Khala wa la Mala. "Neither vacuum nor plenum" (E. G. Browne,<sup>6</sup> 118).

Eleventh Heaven. The Empyrean. The seventh heaven of S. Thomas,<sup>84</sup> "wholly luminous" (68, p. 228).

Tenth Heaven. The Primum mobile (because it originates the motions of the lower "spheres." The Plain. The starless Heaven. Al Falakn'l-Atlas. Ptolemy's Empyrean.

(\* Ch. Maq.<sup>7</sup> p. 4, makes this the ninth heaven.)  
Ninth Heaven. The Crystalline. The sixth heaven of S. Thomas, or "Aqueous"; "wholly transparent." The Celestial sphere. The Highest Heaven. 'Arsh<sup>85</sup> (p. 22). The movements in this accounts for the irregularities of movement in the fixed stars.

Eighth Heaven. The Zodiacal Sphere. The Throne, al-'Arsh (Quran). The fixed stars. The zodiacal heaven is the confine of the material universe. The fifth Heaven of S. Thomas: the starry heaven with eight spheres, the first being that of the fixed stars.

Seventh Heaven to First Heaven: "The sphere of the Planets."  
"Into seven heavens did He fashion it"<sup>86</sup> (W., p. 22).

"He made them complete seven heavens" (Q., 2, 29). "Every sama (Heaven) is a heaven in relation to what is beneath it, and earth in relation to what is above it." Raghīb. quoted in Woking trans. of Quran.

"There are seven corporeal heavens in all, in the opinion of Rabanus"<sup>84</sup> (68, 4, p. 228). Here comes the Angelic Kingdom (good and bad angels).

Seventh. Saturn: Black. The first to be created.

Sixth. Jupiter: Blue. Presided over by Michael. Formed from the light of himma (meditation).

Fifth. Mars: Blood-red. Presided over by Azrael. Formed from the light of Wahm (judgment).

Fourth. The Sun. Presided over by Israfil. Formed from the light of Qalb (heart).

Third. Venus. Yellow. The world of similitudes. Formed from Khayal (phantasy).

Second. Mercury. Grey. Formed from Fikr (reflection).

First. Moon. White, then silver. Made from Aether.  
"The heaven of the moon." Jili<sup>82</sup> (p. 122)

(Here comes "the horizon between matter and spirit."<sup>81</sup>)

Sublunary world.<sup>81</sup> The "world of growth and decay."

Fourth Interspace (Furja<sup>7</sup>). The Human Kingdom.

Fourth Elemental Sphere. Igneous sphere. Fire.

Divided by Rabanus into an upper region, the fiery heaven, and a lower, the Olympian heaven.

Third Interspace. The Animal Kingdom.

Third Elemental Sphere. Aerial sphere. Air.

Divided by Rabanus into an upper region, the ethereal heaven, and a lower, the aerial heaven.

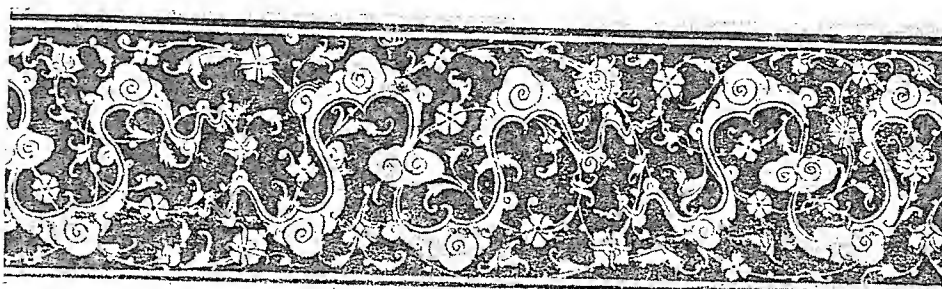
Second Interspace. The Vegetable Kingdom.

Second Elemental Sphere. Aqueous sphere. Water.

First Interspace. The Inorganic World (chiefly E. and W.; aided by A. and F.).

First Elemental Sphere. Terrestrial sphere. Earth.

Jili refers to seven limbos of the earth<sup>82</sup> (p. 124).



## EXPLANATORY EXTENSION OF THESIS II

1. Preliminary remarks.
2. The doctrine of matter and form : (a) Considered statically ; (b) Considered dynamically.
3. The doctrine of imponderable elements : (a) Considered statically ; (b) Considered dynamically.
4. Application of the doctrine to biochemistry, histology, etiology, etc.

## I. PRELIMINARY REMARKS

§ 55. Thesis II is the foundation of the whole Canon, but so entirely has the doctrine and world-conception of Avicenna been superseded by modern scientific teaching that the whole of his work may be said to fall with it.

The fact that for millions of intelligent people this world-conception (scheme of things, theory of life, Weltanschauung) is an intense reality in their daily lives (Forke,<sup>34</sup> p. 239) does not usually signify, and yet even a training in Western universities does not dispose them to abandon it.

So too, the daily-recited Breviary still contains the *Benedicite opera omnia*, in which the four "elements" sing their praise, just as for S. Francis, in his *Song of the Sun* they were an instruction for us to do likewise.

Their immediate dependence for existence upon the continuously exercised will of the Creator is spoken for both by S. Thomas Aquinas, in the West, and by the Persian Sage in the East. "Even air, water, earth, and fire draw their sustenance from Him, both winter and summer" (Mesnavi). As the mighty servants of God ("to us they seem lifeless, but to God living," Mesnavi,<sup>57</sup> p. 15) they offer Him praise (Quran) and service (Mesnavi).

The modern world-conception sets out that the universe is composed of chemical elements grouped into compounds, aggregated into masses varying from the size of vast nebulae to the smaller but still vast "suns," down to the fragments of dust beneath our feet ; whereas the modern scholastic philosophy sees in our space-time world only a fringe (Cf. Job xxvi. 14), and allows that the ancient idea of "heaven beyond the blue" evidenced understanding and not superstition. In short, the doctrine underlying Avicenna is capable of justification.

## 2. THE DOCTRINE OF "MATTER" AND "FORM"

*A. Considered Statically*

§ 56. Inanimate matter, in a state of rest, is the outcome of two principles, neither of which exists apart from the other. These are: the principle of inertia, or passivity; the principle of activity. The former receives the scholastic term "primary matter"; conveniently abridged to *m*. It is the "material cause" of a thing. The second principle is termed "form," "formal cause"; conveniently abridged to *f*. It is non-material.

"Man is the result of the combined operation of heaven and earth, of the union of two principles" (Li Ki "vii. 3. 1).

Every object has its *f*, but every *f* is not corporeal, for while some *f*'s are intrinsically dependent on matter, others can exist apart from matter.

§ 57. *m* remains indifferent and undetermined; it will take an infinite number of active principles *f*. But as soon as a given *m* has taken a given *f*, it ceases to be indifferent, for it has become *mf*. The union of *m* and *f* results in a concrete object—"matter," as ordinarily understood. In other words, it is said that when *m* receives *f*, a physical or corporeal substance (object) appears. *f* is said to "in-form" *m*; when that has happened, we have *mf*, "substantial form," the physical substance, "in-formed matter." So *f* is called the "formal cause" of a thing. *f* is also called a "determining principle." It "perfects" or completes *m*. So, we say, "when *m* is completed by *f*, a physical substance appears." *f* is also called "essential form." Correspondingly, it is said to give rise to *mf*, the "essence."

*f* imparts distinctive nature to *m* and fixes the character and properties and activities resulting from the union. *f* provides the "deep intrinsic reason" for *mf*.

*mf*, *mf'*, *mf''*, *mf'''* . . . *mf<sup>n</sup>* would represent as many different objects, whether living or non-living.

§ 58. *mf*, then, stands for the following concepts: (1) physical substance, corporeal substance. "Corporeal" because evident to our senses. "Substance" because viewed in its "static" state—inactive, stationary. Every chemical substance is a different *mf*. (2) "nature." Here it is viewed in reference to its powers of activity. (3) "essence": here we describe what it is, and say what distinguishes one *mf* from another, from all other *mf*'s. In other words, it has "transcendental properties"—being, essence, unity, distinction from other beings, truth, and good. Every object is a being. Every object is a "creature." Every object perceptible by our senses is a material being. (4) "Constitution." Here we study *mf* from the point of view of how it came into being.

§ 59. Every object has three causes for its existence: material, formal, and efficient. That which brings about the union of *m* (material cause) and *f* (formal cause) is called the "efficient cause." There is another cause called the "final cause"—namely the *reason* for its existence, the reason for its creation.

§ 60. As soon as *mf* exists, certain qualities become manifest to our senses, by which we are enabled to form a mental image of the object—over and above the “transcendental properties” just referred to. These qualities are called “accidents.” In the formula, we represent them by the italic *a*. A concrete object is therefore represented more accurately by the symbol *mf.a*, the dot showing that *mf* forms one essence. To be more exact, then, the different objects around us would be represented by the formulæ *mf.a*, *mf.'a'*, *mf."a"*, *mf.'"a"'* . . . *mf."a"*.

§ 61. A further scholastic term is introduced if we say that “when *mf* (‘potentiality’) becomes ‘actuality,’ it is *mfa*.”—This is another way of saying that until a substance actually exists, it has no “accidents,” or “qualities.”

§ 62. The same symbol—*mf.a*—stands equally for a chemical atom, a chemical compound—inorganic or organic—however complex; for a whole mineral; for a histological “cell” (microbe, protozoan, cell-colony, simple or complex), for a whole plant or animal, or for a human being as a whole. Any object in the universe—water, stone, tree, mountain, herb, sun—can be represented by this same symbol. Every object is a “creature” in the Thomistic sense. Every object is “in-formed” matter. The differences between them all depend on the *f*.

§ 63. “Human nature” is “informed matter,” bearing certain properties or marks, and endowed with “existence.” Each organ in the body is “informed matter.” Every tissue is “in-formed matter.” The blood, the lymph, the urine, etc., are each of them “in-formed matter.” Every microscopic cell of which the tissues are composed is merely “in-formed matter.” So also is every chemical entity which composes the cells, and the whole person also is just “informed matter.”

§ 64. In the case of a living human being there is this complication that each particle of matter of which he is composed is represented by *mf.a*, and the body itself, as a whole, is representable by *mf.a*. To picture the whole person more satisfactorily we should employ a capital letter—say *M*—to stand for the actual matter of the body; and the human “form” would be representable by another capital letter *F*, for the human “form” differs from all other forms. Hence the human being is symbolized by *MF*, rather than by *mf.f'* or *mf+f'*—both of which would be inaccurate.  $M = n.mf.a$ . When death occurs, *MF* becomes *M* and *F*; *M* becomes *n.mfa* again—simply a collection of chemical inanimate substances. *MF* stands for “a human soul.” *F* is not “soul.” *F* does not exist without *M* in the first instance, but after death it does exist without *M*. However, the great and important fact is that at the time of death *F* is no more like *F* at birth; being different, it is correct to symbolize it as *F'*.

The object of life is not to alter one's character, but to *control* it so that the passions never come to light. It is not for us to try and “add a cubit to our stature” (Mt. 6, 27) but to direct our unchangeable “character” into the very highest altruistic direction. The object of life is to prevent the character from determining the form of one's actions. See §164 iv.

Many of the laws operating in the non-living substance *mf.a* also occur in *MF*, though every separate *MF* follows its own laws. The laws peculiar to the chemical substances of which the body is composed necessarily apply in *MF*, as well as those pertaining to his being a particular *MF*. The mere fact of *MF* being altogether more elaborate than its component *n.mf.a*'s (which together make *M*) does not abrogate the applications belonging to those component *mf*'s—a fact which is often overlooked. Rationalism, for instance, assumes that because the lower are still present, the higher must simply be a variety of them.

"In the living conscious being, this qualitative determining factor (the germinal principle) takes a still higher form, its range of activity is wider, its power of applying, directing, and disposing of the energy stored in the organism is more varied and more flexible, but it cannot alter the quantity of the capital funded in the self-moving machine. If, then, it be the quality of the forces distributed in the nervous system which the directive power of the soul immediately determines, the liberation and control of a man's physical activity by his thoughts and volitions need not necessarily conflict with even the most rigid fulfilment of the law of the constancy of the quantity of energy." (From P. Couailhac, *La Liberte et la conservation de l'Energie*, Paris, 1897, Livre iv. ; quoted by Maher<sup>3</sup>, p. 523).

"If an angel or a demon set a barrel rolling down a hill by even a slight push, the action of such a spirit would involve the invasion of the system of the material universe by a foreign energy. But this is not the way the soul acts, according to the philosophy of S. Thomas and Aristotle. Here the soul is part of the living being, a component principle capable of liberating and guiding the transformation of energies (it selects and stores up) in the constitution of the material organism, which along with its compounds goes to form a single complete individual being." (Maher<sup>3</sup>, p. 428).

Again, not in virtue of its rationality is the *forma animale*, but through the vegetative and sentient faculties. (Aristotle, quoted in <sup>17</sup>, ix, 239).

§ 65. There is an important passage on "matter" in the *Summa Theol.*<sup>84</sup> (Q. 85, Art. 1, p. 185-6) which brings out the distinction between the ponderable and the imponderable: the interested reader should really study the whole section of the *Summa*, on the "Understanding."—"Matter is twofold, common and *signate* or individual; common, such as flesh and bone; and individual as this flesh and these bones. The intellect therefore abstracts the species of a natural thing from the individual sensible matter, but not from the common sensible matter. . . . Mathematical species, however, can be abstracted by the intellect from sensible matter, not only from individual, but also from common matter; not from common intelligible matter, but only from individual matter. For sensible matter is corporeal matter as subject to sensible qualities, such as being cold or hot, hard or soft, and the like; while intelligible matter is substance as subject to quantity. Now it is manifest that quantity is in substance before other sensible qualities are. Hence quantities, such as number, dimension and figures, which are the terminations of quantity, can be considered apart from sensible qualities; and this is to abstract them from sensible matter. . . . But some things can be abstracted even from common intelligible matter, such as *being, unity, power, act*, and the like; all these can exist without matter, as is plain regarding immaterial things."

### B. Considered Dynamically. Change

"The kettle is silent, though it is boiling all the while." (Mesnavi<sup>57</sup>, p. 261.)

§ 66. It is natural to consider the objects of the material world as being in the first place stationary; that is, in a state of static being. But actually they all undergo change, from the highest to the lowest. There is movement either in the object itself, or at the instance of some other object. Hence we now consider the dynamic changes in *mf.a.*, *MF*.

§ 67. Changes are of two kinds—"substantial change," "accidental change." The example of the former is the chemical change occurring in the course of chemical reactions. *mf.a* becomes *mf.'a'*. The example of accidental change is, for instance, when water becomes steam; when a person or plant grows; when a person becomes emaciated, or an object shrinks in size.

§ 68. The nature of substantial change is most important in regard to physiology and pathology. The first step is associated with a disappearance of the old *f*, the process called "corruption" by the scholastics; in modern words, "disintegration." There is then a new *f'*—the new "form," whose appearance is called "generation."\*

§ 69. From the point of view of the *causes* at work, there are three steps—an external agent or material cause, a receptive function, whereby the old *m* receives a new *f'*, and the efficient cause which brings *f'* into union with *m*.

§ 70. In the view of modern science, of course, the properties of "water" for instance, appear at the moment when the  $H_2$  and  $O$  meet and unite; the appearance of  $NaCl$  and  $H_2O$ , again, is adequately explained simply from the union of  $NaOH$  and  $HCl$  in appropriate proportions. But Thomistic science perceives the need of something further. The water-molecule, or complex of molecules, is something more than the two  $H$  atoms linked to oxygen, and this something is the inert principle of matter *m*, which releases the old *f* and accepts the new *f'*. As Rahilly explains, a molecule or a complex of molecules such as an organism, presents not only "colligative or summational properties, but also indiscrptible specific qualities of the whole which cannot be distinctively predicated of or portioned out among the parts." "We must therefore conceive—not imagine!—a spatially complex and disparate aggregate as being in some fundamental sense, one "being."†

§ 71. The causes of substantial change (the efficient causes) in inanimate "beings" are the well-known familiar extrinsic "forces of nature"; but in the case of living beings, the efficient causes are the intrinsic "faculties" which they possess. Some of the latter account for changes of substance, while others have to do with a change of position—locomotion; and others again excite a movement in the mind.

§ 72. In the human being, the immediate efficient cause of an outwardly visible act consists of the muscles and nerves; behind that is the more remote efficient cause—the sensuous appetite or desire; and behind that is the sensuous cognition, which is an integral property of *MF*—a passive act, itself a "faculty." Behind that, peculiar to the human being, is the all-important final cause. This is philosophically described as "the means by which perfection of life is reached"—whether that "perfection" be relative or absolute, whether the interests of the physical body are served, or the intellectual life, or whether the highest perfection (i.e. of soul) is the goal in view—where *MF* uses *M* as the "innocent creature of God," in order to attain true perfection.

\*"God is an Abaser and an Exalter. Without these two processes nothing comes into being." Mesnavi<sup>87</sup>, p. 300.

†Rahilly, appendix to "Modern Scholastic Philosophy"\*\*.

In animalibus quae movent seipsa est magis quaedam colligatio partium quam perfecta continuatio (St Thomas, *In VIII. Physic.* i. 7).

## 3. THE DOCTRINE OF IMPONDERABLE ELEMENTS

*A. Considered statically*

§ 73. (1) *Relation of the imponderable elements to "matter" and "form."*—Do the elements belong to "primary matter" or to "form"?

This problem was discussed in so masterly a fashion by St. Thomas that his words are still applicable and unsurpassable. His perfect understanding of the nature of matter is combined with a precision of explanation which should satisfy every student. The following quotations may be made: "By the words earth and water (in Gen. i.) primary matter itself is signified" and not literal water or earth (Augustine<sup>84</sup>, p. 194, S. T. 66; 1). "The ancient material philosophers maintained that primary matter was some corporeal thing in act, as fire, air, water, or some intermediate substance" (ib. p. 192) "Corporeal matter was impressed with the substantial form of water, and with the substantial form of earth" (p. 231) "The power possessed by water or earth of producing all animals resides not in the earth and water themselves, but in the power originally given to the elements of producing them from elemental matter" (ib. 71, i, p. 251).

In the note to 19 it is seen that the four elements cannot be assigned to literal matter. But they cannot be assigned to "form" either, as they have no being until literal matter has itself come into being. Hence, while the chemical elements are *mf*, the imponderable elements are neither *m* nor *f*, for they are inseparable from *mf*, and the primary qualities of a thing do not appear until it exists—that is, till *m* and *f* have become *mf*.—"The two exist because of the one, but hold not even to this one" (Seng-ts'an, in Susuki<sup>91</sup>, p. 184)—words used in another connection, but equally applicable.

§ 74. "Humidity" says Paracelsus<sup>83</sup> (ii. 264) is not "an element of water, or burning an element of fire. An element is not to be defined according to body, substance, or quality. What is visible to the eyes is only the subject or receptacle." . . . "Fire which burns is not the element of fire as we see it . . . the element of fire can be present in green wood no less than in fire. . . . Whatever grows is of the element of fire, but in another shape. Whatever is fixed is of the element of earth. Whatever nourishes is from the element of air, and whatever consumes is from the element of water. Growth belongs to the element of fire" (Cf. "innate heat" § 140) "Where that element fails, there is no increment. Except the element of earth supplied it there would be no end to growth. This fixes it; that is to say, it supplies a terminus for the element of fire. So, also, unless the element of air were to act, no nutrition could be brought about" (Cf. oxygen) "By the air alone all things are nourished. Again, nothing can be dissolved or consumed unless the element of water be the cause. By it all things are mortified, and reduced to nothing" (ib. 266). "The invisible elements need to be sustained, nourished and increased by some visible thing, and at length they perish with them." In other words, the "elements"

only exist as long as there is *mf*. "Both are interdependent and related, though their activity goes on without waste or loss." . . . "Each invisible attracts to itself its own. Stones come forth from the strong spirit of the earth" (ib. ii. 279).

Such passages, often supposed to be meaningless, become intelligible in the light of Thomistic philosophy, though according to biographers, Paracelsus would not have wished to appear to subscribe to that.

§ 75. The imponderable elements must not, however, be confused with "accidents" (*a*). "Primae quatuor qualitates non sunt habitus elementorum" (S. T.<sup>83</sup>, 49, 4, 1). These primary qualities form the link between the object and our own consciousness, for our knowledge of the universe is really simply a knowledge of those qualities (heat, cold, moist, dry) with that of secondary qualities (subtility, thickness, lightness, heaviness, rarity, density, translucence, opacity, brilliance, dullness, etc.). "Sensible matter is corporeal matter as subject to sensible qualities, such as being cold or hot, hard or soft, and the like" (ib. <sup>84</sup>, 85, i, p. 186).

§ 76. So all the concrete objects of this world—from the granite mountain to the microscopic protozoon—are related to one another in virtue of the imponderables. And in virtue of the same, they are related to extra-mundane objects (sun, moon, stars). "The matter of the heavenly bodies and of the elements agree in the character of potentiality" (ib. <sup>84</sup>, 66, 2, p. 199). Since matter cannot exist without them, the human body itself must also manifest them.

§ 77. (2) *The analogy between the four elements and vibration-rate.* The earth element may be compared with a slow vibration-rate, the water element with a more rapid rate, and the remaining elements with still quicker vibration rates. The slower rates are "coarser," and the more rapid ones are "finer." Hence, as Avicenna says, the earth and water are "heavy" and the others are "light." The meaning of the imponderable elements is made more intelligible through the idiom of modern science. But in making such an analogy we must avoid the common error of equating things capable of being analogized with the same thing. To compare the "elements" with vibration-rate, is to compare them with light. "Soul," "radiance," "spirit," "breath" have all been compared with light ("lux"). But to pass on to identify them in any sense with "lux perpetua," and then with "Universal Intellect" is indefensible, yet even modern thought is not immune from the fallacy. Paracelsus<sup>72</sup> explains "element" as "spirit" (meaning "form," no doubt), which "lives and flourishes" in the visible objects of Nature "as the soul in the body" . . . "not indeed," he explains, "that it is of precisely the same essence as a soul, but it corresponds with a certain degree of resemblance. There is a difference between the elemental and the eternal soul. . . . For the first matter of the elements is nothing else than life, which all created creatures possess. The soul of the elements is the life of all created things" (ii. 264). Averrhoes said "of all things the soul is most like light."

The perfect reasoning in dealing with these errors, which is given

by S. Thomas in "Contra Gentiles" should be studied by all who are inclined to award the last word to scientific theories.

§ 78. (3) *Applications of the doctrine.*—The application of the doctrine to the subject-matter of Medicine is simple when the elements are represented by their corresponding "tendencies." A few of the relations are shown in tabular form, by way of illustration. Thus :—

Name of Element.	Tendency.	Corresponding system.	Excretion.	Special Sense.	Operation in body.	Type of mind.	Corresponding mental state.
Earth	Spreading	Skeletal	Faeces	Touch	Gives shape	Mental torpor	Obstinacy.
Water	Drooping	Muscular	Urine	Taste	Nutrition	Lymphatic	Fear. Submissive
Fire	Downward Rising	Liver. Blood.	Sweat	Smell	Digestion	Optimistic	Affectionate. Anger ;
Air	To and fro	Vascular	Saliva	Hearing	Physical movements	Cheerful	irate Vexation (and weeping)
Aether	Stillness	Cutaneous Nervous. The hair	Semen	Vision	Respiration Reasoning	Reflective	Humour Sadness

§ 79. The correspondence between body and mind, in virtue of the pervasion of the whole being by the "elements," is specially elaborated, in a particularly interesting manner, by Chu Hsi<sup>11</sup> (p. 214), where the five elements are taken as the "physical" counterparts of "five ethical principles" (love, righteousness, reverence, wisdom, sincerity), which are present in all beings, just as are the elements.

§ 80. The Buddhist exposition of the human being as composed of five elements—"matter," "sensation," "thought," "action," and "consciousness" (e.g. in Honen<sup>12</sup>, p. 314)—though raising another question—shows how generally the establishing of an intimacy of relation between body and mind is sought after, in all periods of history.

§ 81. Through the doctrine of the elements, the existence of a subtle indispensable link between tissues, organs, fluids, and mental attributes becomes intelligible. The methods of reasoning peculiar to different peoples and individuals, their changes of mood, their personal behaviours are all to be worked out on this basis, as, in his succeeding chapters, Avicenna works out the nature of temperament, humours, and constitution.

"The 'ether' in the constitution of the creature differs in the degree of its clearness and translucence. When the ether with which the individual is endowed is clear and translucent . . . but neither pure nor complete, some entanglement with creaturely desire is unavoidable ; but it can be overcome and got rid of, and then we have the wise man. When the ether with which the individual is endowed is blurred and turbid, there is the beclouding with creaturely desire

to such an extent that it cannot be shaken off, and we have the foolish and degenerate" (Chu Hsi<sup>10</sup>, i. 117).

§ 82. (4) *Associated factors*. Since the primary qualities belong to the elements, the laws of action and "passion" apply. Various aspects of this law are described by the terms: strength—weakness; jelal-jemal (Persian); qaḍā-qadr (Arabic). These determine the phenomena of human life, and therefore call for consideration under the dynamic aspects of the doctrine. Statically they are significant to the physician because they reveal themselves in variations of functional capacity of organs. With the dominance of the several elements we may expect corresponding vigour of the several systems of the body—e.g. the nutritive faculty, and the liver-function; renal functions, etc. The emotional make-up, character, and even talents for art, crafts, literature, politics, etc., attitude towards life in general—all these are "coloured" by the dominant "element." The study of the patient's features, gestures, voice, posture, hands acquires an added meaning, as informing about the strength or weakness of the several systems and faculties—to a degree which is not so very inferior to the information afforded by the expensive instruments of modern clinical research.

See also under "destiny." (§§ 111-115)

"Strength is the manifestation of the positive ether, and weakness of the negative. Each of these again is either positive, and then 'good,' or negative, and then 'evil.' Strength when good is righteous, straightforward, resolute, majestic, firm; when evil, harsh, proud, soft, irresolute, and false. The Mean (the ideal) is the maintenance of these principles in equilibrium." Bruce<sup>10</sup>, p. 111.

### B. Considered Dynamically.

"The five elements move unceasingly, succeeding one another in predominance, in turn, though all always exist simultaneously" (Li Ki<sup>17</sup>, vii, 2, 3).

"The earthy sign (of the Zodiac) succours the terrestrial earth,  
The water sign (Aquarius) sends moisture to it.  
The windy sign sends the clouds to it,  
To draw off unwholesome exhalations.  
The fiery sign (Leo) sends forth the heat of the sun,  
Like a dish heated red-hot in front and behind.  
The heaven is busily toiling through the ages,  
Just as men labour to provide food for women.  
And the earth does the woman's work, and toils  
In bearing offspring and suckling them."

Mesnavi<sup>57</sup>

§ 83. The movement of the elements is mutually opposite (Sum. Theol.<sup>84</sup> 66; p. 197). Change is continually taking place within the human being. This change is either cyclical or progressive. The former characterizes the ordinary phenomena of physiology, and the latter manifest as "growth." The cyclical changes of physiology (in its biochemical aspect) may be described in terms both of the chemical elements and of the imponderable elements. To do so by the pictorial title of "the *dance of the*

*elements* " is at once to bring up the atmosphere of the East, and the very scenery of Avicenna's mind.

" All the four elements are seething in this caldron (the world),  
None is at rest, neither earth nor fire nor water nor air.  
Now earth takes the form of grass, on account of desire,  
Now water becomes air, for the sake of this affinity.  
By way of unity, water becomes fire ;  
Fire also becomes air in this expanse, by reason of love.  
The elements wander from place to place like a pawn,  
For the sake of the king's love, not, like you, for pastime."

Shamsi Tabriz<sup>38</sup> (p. 338).

The changes are the important things;—not the things in themselves, for matter, after all, only exists in virtue of the ceaselessly acting creative power of God. Did He withhold the power, at that instant the matter would cease ; it has no reality apart from His intention. It would not be a case of the world being " destroyed," but one of " ceasing to be." We are apt to be deceived by " matter," and devote our thoughts to this instead of to the changes ; and perhaps the " moment of nascence " (§ 91) is even more important than the changes themselves. The greatness of the ancient " Book of Changes " (Yi King) is due to the recognition of this principle.

§ 84. The advantage of this simile is that it brings out not only movement of a certain orderly kind, but also rhythm and *motif* ; the thought being of such primitive native dances in which the action requires only two dancers (male and female, of course) who are in the presence of many spectators. Each dancer performs entirely different movements, and the *two never come into actual contact*. The movements are harmonized by the music, which is itself as characteristic and essential as either of the performers.

Further, it will be clear that the feelings of the dancers themselves do not concern the watchers ; behind their emotions there is the real meaning of the dance, and whether the dancers discern that or not, the observer should strive to discern it. There may be special affinities or attractions between the dancers of the minuet ; but neither their pleasure, their displeasure, their steps, nor the music, are the basic reality.

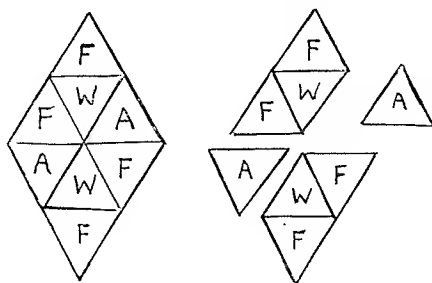
Moreover, the skill of the dancers is not always of the same degree. Artistic genius may produce greater pleasure in the watchers, but there is something greater even than skill.

§ 85. The phenomena of physiology and pathology may be viewed as a series of changes of analogous character, the cycle of changes in chemical elements, tissue-cells, and other rhythmic phenomena being studied without neglecting the conception of the imponderable elements.

§ 86. From the doctrine of matter and form it is clear that with the changes from one chemical compound to another in the course of the cyclical phenomena, there is a dropping of the " form." Also, the imponderable elements rearrange, and blend into new modes at the same time. As the author of *Gulshan-i-Raz*<sup>36</sup> (lines 250-255 and footnote) says :

" The elements, water, air, fire and earth,  
 Have taken their station below the heavens ;  
 Each serving diligently in its own appointed place,  
 Before or behind which it never sets its foot.  
 Though all four are contrary in their nature and position,  
 Still one may see them ever united together.  
 Inimical are they to each other in essence and form,  
 Yet united into single bodies by fiat of necessity.  
 From them is born the three-fold kingdom of Nature."

§ 87. To present a simple example, for illustration—Glucose, for instance, would be described as  $WA^2F^4$ , each letter representing the corresponding imponderable element. When this substance is broken up into alcohol and  $CO_2$ , by the dispersal of the " cohesive force between the three elements (e.g., by the influence of an "opposite": the yeast-ferment), two portions of  $WF^2$  result, the " air" having escaped, and the " fire-water " of the aborigines being left behind. This may be represented pictorially thus :



The germination of seeds may be described in similar terms. Thus, it would be said that the ethereal undulations from the sun penetrate the loosened earth round the seeds, and by their successive shocks affect the particles of matter composing the germinal centre of the seed. The readjustments of atoms and compounds with oxygen result in the generation of vital energy. The " earth " (mineral substances, and remnants of animal and vegetable matter) mingled with " water " (moisture) forms the factor of " heavy elements " (20). The " air " (its oxygen content), " fire " (solar heat), and " aether " (sunlight) make up the factor of " light elements." The two series together affect the starch in the seed, bring about its change into glucose, whereby the seed swells until the plumule emerges, and the rootlets begin to penetrate the soil in search of " water " and " earth," while the leaves expand to take in the " air," and " aether " by the aid of " fire."

§ 88. Expressed in another way, there has been a change of vibration-rate. Or we might regard the imponderable elements as compulsorily riding upon the chemical elements during their metabolic interchanges, although the fire, water, earth or air cannot be thought of as retaining a sort of identity throughout. It would be better to use another idiom: the noumenal is coterminous with the phenomenal. Or, comparing it with wave-motion, it is as if there were two superimposed curves. When the two curves tally, every dip of one meets a dip in the other. The imponderable dips

down, as it were, into the world of matter, illuminating the "ocean of physical matter" according to the mode (intensity of vibration) in which it touches the lower curve. At each rise of the wave, the former returns into the metaphysical "ocean," and in doing so, the physical matter returns to (momentary) inactivity.

The breaking down and building up of substance, in the course of metabolism, is the same as the scholastic "corruption" (disintegration), and "generation" (reconstruction); and is concurrent with the changes in the imponderable elements. In Avicenna the process is thought of in their terms, whereas to the physiologist the process is worked out in terms of the material chemical elements.

So, in Chinese philosophy, we are introduced to the alternating opening and closing operations of Nature, which are controlled by the "Law," as the pivot controls the opening and closing of a door" (p. 134). (Cf. with urooj-nasool in Sufic philosophy.)

§ 89. Hence we find that Thesis III is working out the dynamic consideration of the imponderables, under the title of "temperament." It is the action and "passion" between the opposites which results in "temperament." This conception carried through all aspects of man provides the explanation of the diversity which characterizes the unity—one human being.

Akhlag-i-Jalali<sup>25</sup> says: "In truth there is one and the same principle, which, if prevailing in the attempered elementary particles is equipoise of temperament, if produced in musical tones is excellent and delightful intervals, if apparent in the gestures is grace, if found in language is eloquence, if produced in the human limbs is beauty ('Though their beauty charm thee,' Quran, Sura 33, v. 52), if in the qualities of the soul equity. Of this principle the Soul is enamoured and in search, whatever form it may take, whatever dress assume" (Verses 625-630 of Gulshan-i-Raz; many other passages in this poem are equally applicable).

This therefore forms the introduction to Thesis III.

#### 4. APPLICATIONS OF THE DOCTRINE

##### (a) *To biochemistry.*

§ 90. Starting with the conception of matter so far detailed, both statically and dynamically, and applying the dynamic aspects of the imponderable elements designated as a "dance," we may proceed to trace the chemical elements and compounds through the body, entering as they do in the form of solid and fluid articles of diet, or by means of respiration. The chemical elements are seen to be in a form which is sometimes "fixed" or "bound" (combined), sometimes "free." They pass into the tissues, and linger there for a longer or shorter time before passing out again. During practically the whole of this time they are combined, but at the actual moments of chemical interchange they become free or "nascent"—the moments when *f* becomes *f'*.

§ 91. It may be said that that moment of *nascence* is the focus, or the whole purpose, of the cycle of changes which occur in the

body—anabolic and katabolic. That one moment is the opportunity for vital actions to actualize. That moment finds its location in this or that histological unit or tissue-element, which itself is, in a certain real sense, itself the actualization of that moment!. This moment achieved, they become bound once more and steadily descend the ladder of metabolism until they are found once more outside the body. To quote from a deep thinker of the early Victorian age: "Nitrogen, like a half-reclaimed gipsy from the wilds, is ever seeking to be free again, and, not content with its own freedom, is ever tempting others not of gipsy blood to escape from their thralldom" (Religio Chemici,<sup>78</sup> p. 149).

§ 92. At this same vital moment of the cycle, there is a change of the *pivot of function* in the substances concerned. All the substances with which the subject of metabolism deals belong to the carbon compounds, whose structure is well known to be described with the terms straight chain, double-chain, ring-compounds, etc. With these forms of "skeleton" are associated the various "side-chains" which are to the others as the limbs to the body. All the familiar groups of biochemistry (paraffins, primary and secondary alcohols, aldehydes, acids, amides, ketones, ethers, sulphonic acids, albumoses, leucins, purins, diaminoacids, sugars, etc.) may be thought of as presenting a sort of individuality which depends more on the side-chains than on the skeletons, and yet the radicles of which these side-chains are composed owe their character more to stereochemical position or other relations than to the elements which belong to them. With change of formula there is no doubt a change of physical state (colloid, crystalloid), of electrical reaction and so forth. But the fact of change (Cf. § 83) is still more important, even than the change of personality or individuality (so to speak). The pivot of function changes from one element—carbon, e.g.—to another (nitrogen, sulphur, phosphorus, e.g.). The important thing is that from being carbon-centric, the physiological processes are nitrogen-centric, sulpho-centric, phospho-centric. Or, unicentricity gives place to duo-centricity (e.g. sulpho-ferro-centric), or perhaps multi-centricity (e.g. in albumen), because the function cannot pass on to a new pivot unless two or more other elements have come into special association.

For instance, in oxy-centricity, a compound constructed on the straight-chain skeleton (-C-C-C-C-) may become oxycentric, because the new basis is -C-O-C- (formation of anhydrides, esters, etc.). Here the important thing is that the centre of function is -O- and no longer -C-. In nitro-centricity, the change is associated with the appearance of -C-N-C-, the centre of function being now -N-, which is important. In sulpho-centricity, a compound with a group -C-S-O<sub>3</sub>H (thio-ethers, allyls, etc.) may arise; this is quasi-pathological for the human body, and however insignificant the -S- may be to the chemist maybe it is evident to the senses in virtue of a distinctive odour. Such compounds as sulphocyanides, taurocholates, indoxylsulphates, melanin, various mucins, lardaceous substances, hair, and the horny skin have an importance of their own,

and some of them form the links between nitro-centric and sulpho-centric compounds. In phospho-centricity, the dominance of the phosphorus atom is the culmination of the purpose of the metabolic change. So the author of *Religio Chemicæ* (p. 149) said "phosphorus is in the active condition at the centres of vital action and in the passive (allotropic) state at the outlying points." In the case of lecithin, there are variations of centricity. Its nitrogen, phosphorus, or hydroxyl may be dominant according to the metabolic circumstances, and the subsequent linkages and fate of each successive derivative is according to those circumstances.

Other elements may come to form important pivots of function, under more or less exceptional conditions (e.g., arsenic, silicon, etc.).

§ 93. It is clear then, that we can watch the metabolic processes from the chemical side as a sort of pageant or procession. But if we view it as the chemist does, according to syntheses and analyses, oxidations and reductions, and according to the intermediate products which he discovers when he arrests that pageant, as one might stop a dance in order to be sure that a certain individual was present or not, we may easily come to conclusions quite at variance with the living truth. Stop the dance, and the illusion is destroyed. The life has gone!

The living cell does not necessarily follow the programme of the laboratory. Indeed it might be doubted whether any substances as such ever appear except at the end. The actual process might well be like a shuffling of cards, whereby the order of the cards is altered and the order or relative position is the important thing. On the anabolic side there is always the face; on the katabolic side there is always the back. Between the two there are always the same atomic personalities which remain as it were in the same room but change about to receive different ranks with respect to one another.

Each element may be traced through its various phases, through compound after compound, its behaviour being modified by the side-chains, and its importance altered, so that now it has a regal position, with the others as its slaves, and now is reduced to slavery, subservient to another element which has now assumed the royal position. Each in turn receives homage from its fellows; each enjoys a brief reign upon the throne.

§ 94. Such is the chemistry of life, viewed mystically. It is an incessant movement. Interchanges proceed continually, and not only in one substance at a time, but in a thousand at a time; not one element only (C, H, N, O, S, P) but all of them simultaneously—not necessarily one ruler, but sometimes co-rulers, in the various substrates of action; not all at the same rate, but at different rates and with different rhythms.

§ 95. (b) *In histology*.—These pictures of biochemical processes must be linked up with what we actually see with the naked eye and with the microscope. Morphological changes are all manifestations of the unseen or invisible biochemical cycles. Not "structure first, then function." Not "function first, then structure." The two are inseparable both in time and place. Hence,

however exact his histological knowledge, the physician must hold clearly before him the activities which only the mind can hold and piece together and watch. The histological appearance shows us the processes arrested at a particular moment when some group is dominant and another "recessive." Its very appearance is artificial, the produce of reagents acting upon a dead "fixed" protoplasm; a reaction between complex dyes and the chemical substances produced by the fixatives. That which appears to be the permanent substrate for functions, a definite scaffolding, is quite otherwise. In the picture given of the dance of the elements in the body, the "skeleton" seems a base from which side-chains arise and give purchase for the "dancing" element; but as a matter of fact the skeleton, the side-chain, and the element are mutually necessary. The whole structure is altering the whole time. So with the tissue. The change of chemical substances entails a change from solid to colloid, colloid to fluid, fluid to gas or back to colloid; and while so doing they become perceptible under the microscope as cell-substance, cell-fluid, cell-juice, tissue-juice; fluids aggregate and condense into "cells" (colloid phase); cells constantly dissolve or "splay out" into fluid, or undergo partition from larger and larger particles into submicroscopic and finally into visible microscopic particles, or else undergo partition into "supernatant fluids" of simpler chemical composition. In the course of these changes solids and the like separate out; and these last are usually but faultily regarded as products of metabolism comparable to the goods manufactured in a factory. The appearance of granules rather than fluid, or precipitate rather than solution in the tissue, depends on the kind of elements concerned (mineral atoms, ordinary atom-groups), and the direction of interchange. See § 125.

Some examples of the steps of the cycle towards visibility :

<i>Fluid phase.</i>	<i>Colloid phase.</i>	<i>Submicroscopic character.</i>	<i>Microscopic appearance.</i>	<i>Fate.</i>
Homogeneous "humour"	Cell-substance	Spongioplasm	Tissue cell as a whole	Excretable substance and protein derivatives.
Abnormal "humour."	Atrabillious humour	Less colloidal	Coarse particles (insoluble)	Inexcretable without medicamentous aid.
Tissue-fluid	Serum-protein	Aminoacids	Bioplasm; occasional crystalline deposit	Urea, etc.
Sulphur	Colloid Sulphur potentially excretable phase.	Larger particles of Sulphur	Cell-granules, cell-wall	Sulphur derivatives; sulphonic acids, etc.

§ 96. It is not possible to prepare a fully exact correlation between the carbon, nitrogen, phosphorus, and sulphur series and structure seen under the microscope. Broadly speaking, the carbon series is related to the cell-substance; the nitrogen and phosphorus series are associated with the nuclear structure. Certain kinds of cells are associated more with some elements than with others. Moreover one must always bear in mind that the movement is all through the cell, all through the whole histological unit. The fulfilment of the functions of such a unit implies the simultaneous movement of all the elements concerned, and each cycle proceeds at a different rate.

§ 97. It is less easy still to present a picture of the movement in a whole tissue in these terms. Only here and there does some product emerge which is identifiable by the physiologist and biochemist. Endless intermediate steps and changes find their concrete expression in the one product which we perceive as some detail of cell-structure under the microscope. We may trace various isolated substances in certain parts of certain cells of the body, and yet are not able to dogmatize about them, because in the process of life in the tissue there is a constant flow of matter, the visible becoming invisible, and then again visible. That is, the visible food material taken in, the invisible changes and interchanges of elements and atom groups (the "metabolism") and their changing pivots of function; and the finally visible product of excretion. If there be a range of variation from a "normal" in the steps of this "dance" there is at least no doubt that ill-health comes of a change of rhythm when the "foot-falls" are out of time, or some of the "steps" omitted.

§ 98. It is clear that if the changes in the imponderable elements should chance to fail to run concurrently with the breaking down and building-up of substance (the scholastic corruption or disintegration and generation or reconstruction), this would also mean a break in the rhythm; the wave-motion would not be symmetrical, to use the previous simile; and the body would be "ill." But it may be added, in passing, that the varying dispositions exhibited by people are the manifestations of lack of perfect symmetry and synchronism; perfect symmetry would show among other things as "a cheerful disposition."

§ 99. The histology of an organ is the visible sum total of chemical units, with the atom groups of ponderable elements successively formed in the cells and tissues. These constitute the stage and scenery of the metaphysical "dance"—that of the imponderable elements which interweave and complete the picture of the living processes. But to understand the picture itself, and see its meaning, brings us to questions which must be deferred at this point.

§ 100. The wonderful insight into the processes taking place in the human body which is afforded by the conception of "macrocosm" and "microcosm" used by the alchemists of old, and still rightly used by many thinkers, is sufficient justification.

In nature we see, for instance, a crowd of human beings, composed of hundreds of units which have aggregated for a relatively few moments. We may call it simply "a crowd," or we may specify and say what kind of a crowd. As one watches

it, people come up to it; others leave; others walk by without deviating their steps. Perhaps in five minutes it has all dispersed.

What of it? What was its purpose? What was its effect?—here or perhaps elsewhere? Perhaps it is subversive of order, anarchical, pathological; perhaps it is simply mechanical, obstructive, congestive.

Such may be observed under the microscope, but we call the components cells or perhaps excretory products or foreign bodies. To some, such analogising is fanciful and useless. But that Avicenna found this method of enquiry vastly productive and helpful there is no doubt. As a faithful Moslem, too, he would realize the voice of the Quran, saying, "these things are to you for a sign." Words belonging not only to the moral law, but also to the law of Nature in all its ramifications—for the Artificer and the Lawgiver are one.

§ 101. By the time we have grasped these several aspects and associated them with the chemical aspect of life, we have formed a nearer approximation to the true picture of life *at that moment of time*. But it has already passed on to something different! However, there is no way of keeping pace with that except by understanding the cycle of changes in each and every case. Cycles of incipience, of growth, of maturation, of decay. The *reason*, or *cause* of the change, is to be understood before one can keep pace.

§ 102. *The causes at work in the dance of the imponderable elements.*—The mutual attraction and repulsion which underlies all change is to be found inherent in the imponderable elements, as it were by definition. The active and passive qualities of the separate elements come into play when they are compounded, and (because they necessarily occur in the same "geographical" spot, and are only separable by mental analysis) they have to do even with physical state (solid, fluid, colloid, gaseous) and form (granular, amorphous, crystalline) and physical property (solubility and insolubility; positive or negative electrical charge). Hence they may be said to affect the *direction* of movement, whether to less colloid state, or more colloid, to differentiation or de-differentiation, clearness or sharpness of reaction, or to confused state.

§ 103. This doctrine may be brought beside the Chinese principle of Yang and Yin.

To the Yang principle belong the ideas: anterior, south, rising, fecundating, expanding, growth, advancing, strength, order, heat, motion, cheerfulness, life.

To the Yin principle belong: posterior, north, falling, breeding, contracting, decay, retarding, weakness, confusion, cold, rest, anger, death.

In relation to the body: Yang belongs to the breath, the head, the speech, the eyesight, exhaling; the shape of the body. Yin belongs to the blood, the feet, the vital force, silence, inhaling; the "body" itself.

Yang is active, flowing, fullness, straightness, music. Yin is passive, tending to inertia, emptiness, crookedness of form, ceremonial.

There are relations between yang and yin, and hardness or softness, and the organs of the body. (Forke<sup>23</sup>, 216).

"When the ether has the proportions of the yin, and the yang correct and harmonious, there is perfection of the ether, and it is equally permeable by all five elements, as in the case of man. When the proportions are unequal, there is imperfection of the ether, the manifestation of the elements is unequal, as in the case of animals."—BRUCE,<sup>10</sup> footnote: i. 115.

§ 104. The idea of Yang and Yin swinging as a pendulum may add to our conception of life. The rocking of the cradle has the subtle purpose of throwing the yang and yin into rhythm, and the

movement of the infant's breath into rhythm, which, once started, will continue for at least an hour or two. (See 698.)

§ 105. *Urooj: Nasool.*<sup>38</sup> Rise and Fall. The anabolic process belongs to the former; the katabolic (formation of "effete" substances, their removal from tissues and organs—whether by deposition in tissues, as atheroma, or by discharge from the body) belong to the latter. These terms in Persian mysticism emphasize the fact of changes and movements running in cycles. Each individual has his own characteristic cycle of changes; the movement of the "breath" goes by cycles. The life as a whole shows its cycle, being sometimes 75 years, sometimes more, more often much less. In addition there are the smaller cycles—waxing and waning of vital force in a certain rhythm peculiar to the person, and carrying with it susceptibility or resistance to infection, and the like.

§ 106. *Other principles:* these would be expressed as laws, which can be classified into various groups—those belonging to nature in general; those belonging to human nature; those belonging to our conceptions of life, health, and disease. Law of qadā and qadr; construction and destruction; of distribution; of interdependence; of intention; of compulsory visibility (discontinuous functions, etc); of desires. Note § 82.

§ 107. *Cause of synchronism:* namely between the two dancers in the simile; these dancers being the material element and the imponderables respectively. This lies in the conception of "breath" or "life-principle," with its cycles.

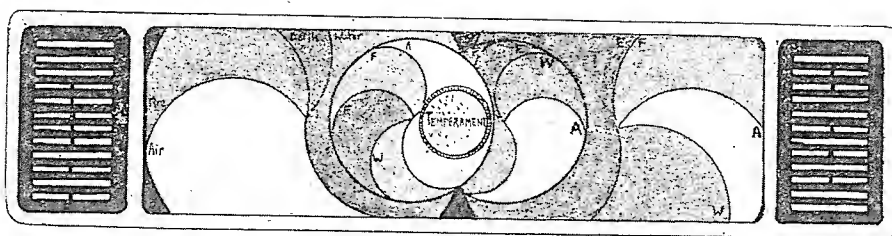
§ 108. (d) *Extramundane and extracorporeal influences on the human body in virtue of the common content of the "four elements."*

That there are definite extracorporeal influences on the metabolic workings of the human body should now be intelligible. The effect of heat, cold, wet climate, dry climate is well enough known but is widely ignored, as evidenced by elaborate researches into chronic articular "rheumatism" being apparently made in every direction but this.

To go further, and agree with the ancients that epidemics and the like had relation to planetary influences, is not necessary; nor is it necessary to dismiss their possibility off-hand. It is not safe to argue that there is no relation between the planets and stars and life on this earth simply because some relation once thought to be true is now discredited. If the whole universe is one organic whole, there cannot but be some relation.

The relation between seasonal irregularities and the interactions of the "elements" is referred to by Forke<sup>23</sup> (p. 298, footnote), in showing how the Chinese associated each season with the dominance of a given element.

According to the influences prevailing at the time of birth, so is the endowment of the person born "with such an ether." If "toward, the disposition is bright and good . . . if untoward, not." Chu Hsi<sup>10</sup>, 85. In time, and with constant self-culture, "the inequality of etherial endowment will of itself disappear." ib., 86.



### THESIS III

26.

#### I. THE TEMPERAMENTS



TEMPERAMENT is that quality which results from the mutual interaction and interpassion of the four contrary primary qualities residing within the (imponderable) elements.

There is a fight between the qualities; a combat (Costaeus' annotation). "The temperament is something set up by contrary qualities as a kind of mean between them." (S. Thomas,<sup>82</sup> lxiii. p. 165, where "complexio" is rendered "temperament" as it is throughout the present work.)

"How strange that the elements should be so contrary,  
And yet be forced to live together."

Gulshan-i-Raz,<sup>25</sup> p. 26.

27. These elements are so minutely intermingled as each to lie in very intimate relationship to one another. Their opposite powers alternately conquer and become conquered until a state of equilibrium is reached which is uniform throughout the whole. It is this outcome that is called "the temperament."

"Elementum aliquod oportet predominari in omni mixto."<sup>83</sup>  
49, 6, i. m; 79, 2, 2m.

"This is a drawn battle." (Costaeus<sup>18</sup>.)

In the design forming the heading of this page, four transparent discs are shown superposed. The discs represent the primary qualities. The tinted segments represent the imponderable elements. The central ring marks off the superposed discs as viewed together in one "temperament." As each disc revolves, different tints come into new positions, and thus represent different temperaments as met with in different individuals.—The lateral figures serve to recall the principles of the "Book of Changes."

The initial letter is taken from a French manuscript of the twelfth century.

28. Inasmuch as the primary powers in the aforesaid elements are four in number (namely, heat, cold, moisture, dryness), it is evident that the temperaments in bodies undergoing generation and destruction (ana-, kata-bolism) accord with these powers.

30. A simple rational classification is into two modes :  
 (a) *Equable* or balanced. Here the contrary qualities are present to exactly equal degrees of potency—neither of them being in excess or deficiency. This temperament has a quality which is exactly the mean between two extremes. (b) *Inequable* or unbalanced. Here the quality of the temperament is not an exquisitely exact mean between the contraries, but tends a little more to one than to the other. For example, to hot more than to cold ; to moist more than to dry ; or contrariwise.

“ One or other proves victorious.” (Costaeus.)

“ Fire, water, earth, and air, the four elements of which bodies are compounded, lose their individual qualities in the compound bodies, and equipose (equity) is what unites them into homogeneous compounds.” (Lahiji,<sup>25</sup> p. 61).

“ When . . . the elements attain equilibrium, the beams of the spirit world fall upon them.” (*Ib.*, couplet 615.)

“ When it is said that the nature of a man or thing is hot and of another is cold, such statements include both the physical element and the immaterial principle with which they are endowed.” Chu Hsi<sup>10</sup>, i. 94.

The idea of “ balance ” may be applied to a variety of phenomena in health and disease—both of body and mind. Lack of balance brings sickness, and explains death. Examples :—atony ; hypertonicity ; hyperacidity ; excessive trichosis ; the various phenomena nowadays ascribed to loss of balance in the domain of endocrine secretions, and hormones. The body may be too cold (subnormal temperature) ; the mind may be “ cool ” ; the heart may be too “ warm.” There may be inadequate repose after mental activity, leading to loss of mental balance. There is dynamic balance as well as static balance.

31. (It is to be noted that) a temperament, as understood by Medicine, is never strictly equable or strictly inequable. The physician should abide by the philosopher who is aware that the really “ equable ” temperament does not actually exist in the human being any more than it exists in any “ member.” Moreover the term “ equable,” used by doctors in their treatises, does not refer to weight but to an equity of distribution. It is this distribution which is the primary consideration—whether one is referring to the body as a whole, or only to some individual

member ; and the average measure of the elements in it, as to quantity and quality, is that which (standard) human nature ought to have—both in best proportion and in equity of distribution.

As a matter of fact, the mean between excess and deficiency of qualities, such as is characteristic of man, actually is very close to the theoretical ideal.

The fact that temperament is concerned with the primary qualities and not with secondary ones should enable one to avoid the idea of weight (*pondus*) in regard to the subject. In the annotation of the 1608 edition there is a reference to Averrhoes, as agreeing with this point. However, if one realises that the "elements" are "imponderables," it becomes self-evident that Avicenna's dissertation is correct, and that he himself quite realised the attitude claimed for him in this treatise.

**32.** *Eight varieties of equipoise* :—Human beings show eight varieties of equable temperament. Equipoise of this kind does not occur in animals, nor do these even approach to the equable state we describe for man.

See also § 109 and the quotations there given, which insist on the fundamental difference between man and animals.

The eight varieties are as follows :—

A. *In relation to beings other than man.* (i) the equability of temperament seen in man as compared with other creatures ; (ii) that which is found in different human beings ; (iii) that which is taken in relation to external factors, such as race, climate, atmosphere ; (iv) one taken in comparison with the temperament of extremes of climate.

B. *In relation to the individual himself.*

(v) as compared to another person ; (vi) as compared with the states of one and the same person ; (vii) as compared, one member with another ; (viii) as compared with the states of one and the same member at different times.

**33.** We now discuss each of these modes in turn.

i. Equability of temperament as found in man taken in comparison with that of other animals. The range is too wide to be comprehended in one definition, although there are certain definite limits, upper and lower, beyond which one cannot pass without the temperament ceasing to be a human one.

ii. This is one which is between the two extreme limits of the range of temperament shown by a person throughout his life (*p*)—namely that shown at the period of his life at which growth has reached its limit. This, of course, is not the equilibrium referred to at the outset of this chapter as only theoretical, and practically never found in practice—though approximating

closely to that. Such a person is so near to approximate equability only as far as corresponds to the co-equation of his members, or the interchanging contra-action of his hot members (e.g. heart), with his cold ones (e.g. brain) ; moist ones (e.g. liver) with dry (e.g. bones). Were all these of equal influence, the resulting condition would be very near to one of ideal equability, though not so as regards each individual member, except in the case of the skin itself, as will be explained later. In regard to the breaths and principal organs, the temperament cannot possibly approximate to this exquisite equability ; it oversteps this in the direction of heat and moisture. The heart and the breath are the root of life, and they are both very "hot"—indeed to excess. For life itself depends on the innate heat, and growth depends on the innate moisture. Indeed the heat is present in and maintained or "nourished" by moisture.\*

In the case of the principal organs, of which there are three, as we shall show in the appropriate place—the brain is cold, but its coldness does not modify the heat of the heart and liver. The heart is dry or nearly so, yet its dryness does not alter the moisture of the brain and liver. Neither is the brain absolutely and entirely cold, nor the heart absolutely and entirely dry. The heart is dry *compared with* the other two ; and the brain is "cold" *compared with* the other two.

iii. The limits of the *third mode* are narrower than those of the first, although still quite wide. This is a special equability peculiar to the race, climate, geographical position or atmosphere. The Hindus, in health, have a different equability to the Slavs, and so on. Each is equable in regard to their own race, but not in regard to others. So if a Hindu were to develop the temperament of a Slav he would probably fall ill, and might even die. So, too, if the temperament of a Slav should come to be that of the Hindu, for the state of his body is contrary. So it seems that the various inhabitants of the earth have received a temperament appropriate for the conditions of their particular climate, and in each case there is a corresponding range between two extremes.

iv. The *fourth mode* is one which is a mean between the two limits of the range of the climatic temperament. It is more attempered than the temperaments of the third mode.

v. The *fifth mode* presents a much narrower range than the first or third mode. It is the temperament peculiar to each

\* Fire "feeds on" air. So innate heat consumes the innate moisture (Costæus<sup>18</sup>).

separate person, in that he is alive, and also in health. It shows a range between two extremes—upper and lower. One must realize that every individual person has a temperament entirely peculiar to himself, and it is impossible for any other person to have an identical temperament, or even to approximate thereto.

vi. The *sixth mode* is intermediate between those two limits. When the person has this mode of equability of temperament it will be the most suitable for him.

vii. The *seventh mode* is the equability of temperament characteristic for each of the several members of the body, for each is different from the other. In the case of bone, the equable temperament has dryness more than other qualities ; in the case of the brain, moistness is more conspicuous ; in the case of the heart, warmth ; in the case of the nerves, coldness. Here also there is a range—upwards or downwards—consistent with equability, but less than in the before-named modes.

viii. The *eighth mode* is that form of equable temperament which is proper for each given member. When it has this particular temperament it is in the best state possible to it.

34. When we study the matter we find that of all beings, man is most near to the ideal equable temperament. Of all races of men, those who live in countries within the equinoctial circle, away from mountains and seas, approach the ideal equable temperament more closely than others, and those living in other countries. It is asserted that the more nearly overhead the sun is [i.e. in the torrid zone], the greater does the temperament of the people deviate from the ideal equability. But this is false, for when the sun is overhead it is less harmful, and alters the atmosphere less there than it does with us, or less for those at greater latitudes than for us—though of course we do not have it overhead.

In the case of peoples living in the equinoctial zone, the states of the body are in all cases more like the ideal ; the atmosphere in these regions exerts no evident deleterious effects, but is always in harmony with their temperaments. We have already (elsewhere) expressed our agreement with this opinion.

In the case of peoples living in the fourth climate, they are more attempered. The sun's rays are not overhead long enough to scorch them, but are not as oblique as in the second and third zones of the earth. Such people are not exposed to cold from great obliquity of the sun's rays, as occurs in the case of peoples living at the extreme edge of the fifth climatic zone.

35. It has already been stated that the chief organs do not approach closely to the ideal equability of temperament. Of all members the flesh comes nearest to the ideal; the skin comes next, for it is hardly affected by attempered water (i.e. water prepared by mixing equal parts of snow water and boiling water). It may be that the flesh is so well attempered because the heat of the breath and blood within it is balanced by the coldness of the nerves. And there is also the fact that it is not subject to the influence of the body itself, for the fact that drier and moister elements are equally present in it accounts for it being well attempered. We know too that its absence of sensation is another reason why it is not subject to the influence (of the body). It is only subject to intrinsic factors, or dissimilar qualities. For, as we know, when things have a common origin, but are opposite in nature, mutual interaction results, whereas a thing is not affected by anything whose quality is similar to itself (*p*).

36. The most attempered part of the skin is that of the hands. The most attempered part of the skin of the hands is that of the palms and soles. The most attempered part of the skin of the palms of the hands is that of the finger-pulps. The most attempered part of the skin of the finger-pulp is that of the index. The pulp of the tip of the index-finger is the most sensitive, and that of the other finger tips is more sensitive than other parts, because they judge of the nature of tactile qualities. There must be a lessening of sensitiveness from the middle outwards in order that one can perceive a deviation from equability.

“The more the organ of touch is reduced to an equable complexion, the more sensitive will be the touch.” (S.T.,<sup>84</sup> 76, 5; p. 44, trans.)

37. In saying a medicine is of equable temperament, we do not use this expression in the absolute sense, because that would be an impossibility. Nor do we mean that it is attempered correspondingly to the human temperament, for in order to be that the medicine would have to be actually composed of human substance. We mean this—that when the medicine is exposed to the action of the innate heat within the human body, its quality will not over-reach either of the limits (of equable temperament) proper to the human being. Consequently it will not produce an effect beyond those limits. Therefore, in regard to its actions within the human body it is attempered, of equable temperament.

Similarly, when we say a drug is hot or cold, we do not mean an absolute heat or coldness of substance, or that it is hotter or colder in substance than is the human body. Otherwise it would imply that the drug has a temperament like that of man—equable. What we mean by the statement is that through the drug hotness or coldness comes to the body, in a degree over and above that degree of heat or cold which is in the body already. Consequently a medicament may be at the same time cold—that is, compared with the human body—and hot—that is, compared with the body of a scorpion ; it may be at the same time hot—that is, compared with the human body—and cold—that is, compared with the body of a serpent. More than that, a medicament may be hotter towards the body of Peter than it is to the body of Paul. It is important to know this when choosing medicines with the object of altering the temperament. One must take care not to employ a medicament which from its very nature could not have the effect desired.

**38.** Now that we have explained the subject of equable temperament sufficiently we pass on to consider *the inequable temperaments* (“*intemperaments*,” dyscrasias).

They are classified according to race, individual, and organs. There are eight variants, all of which agree in being contrary to the eight equable temperaments named above.

(A) the simple types show a deviation from the normal equipoise only in respect of one contrary.

(B) the compound types show a deviation from the normal equipoise in respect of two contraries at once.

**39.** A. The *simple intemperaments* are as follows :—

(a) where it is an *active* contrary quality which is in excess :

(i) hotter than it should be, not moister or drier.

Hot intemperament.

(ii) colder than it should be, not moister or drier.

Cold intemperament.

(b) where it is a *passive* contrary quality which is in excess :

(iii) drier than it should be, but not hotter nor colder.

Dry intemperament.

(iv) moister than it should be, but not hotter nor

colder. Moist intemperament.

These four intemperaments are only temporary, for when too hot, the body becomes drier than it should be ; when too cold, the body becomes moister than it should be, by assuming extraneous moisture ; when much too moist, coldness supervenes more rapidly than dryness would. If the dryness be not very

great, the body may remain in that temperament for a considerable time, though ultimately it will become colder than it should be.

It will be clear, then, that equipoise and health depend more upon heat than upon cold.

So much for the four simple intemperaments.

**40.** *The compound intemperaments.* The four compound intemperaments are those in which there is a departure from equability in respect of two contraries. Thus, the temperament may be at the same time hotter and moister than it should, hotter and drier than it should, colder and moister than it should, colder and drier than it should. Obviously it cannot be simultaneously hotter and colder, or drier and moister.

**41.** Each of these intemperaments is further subdivisible into two forms (thus making sixteen intemperaments). (*a*) Those apart from any material substance—(qualitative ; formal). Here the temperament is altered only in regard to one quality, because the fluid pervading it has the same quality as that towards which the body is being changed as a whole. Yet it does not do so unless it be in virtue, e.g., of heat (in fever) or cold (extraneous cold).

(*b*) Those in which some material substance is concerned (material). Here the body is only affected by the quality of the intemperament in virtue of the increased amount of some particular body-fluid. For instance, the body is cooled by vitreous serous humour ; heated by leek-green choleric humour.

**42.** Examples of the sixteen intemperaments are given in the third and fourth volumes.

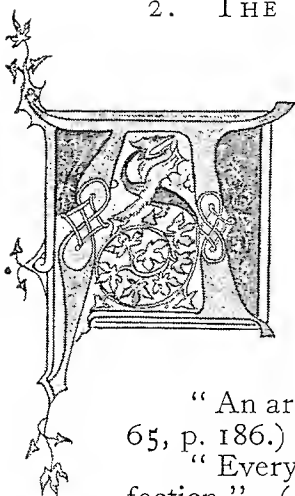
**43.** Intemperaments in which some material substance is concerned occur in two modes : a member may be pervaded by the material substance entering from without, or it may be pervaded by the material substance which has reached the tissues of the body and fails to get out through the orifices of the channels or from the cavities of the body. Such retention of material may be the beginning of the formation of an inflammatory mass.

This completes the chapter on intemperaments.

**44.** The physician is again reminded that he must seek an explanation of the deeper intricacies of this subject in [esoteric] philosophy, for they are not self-evident.

## 2. THE TEMPERAMENT OF THE SEVERAL MEMBERS

## 45.



ALLAH most Beneficent has furnished every animal and each of its members with a temperament which is entirely the most appropriate and best adapted for the performance of its functions and passive states.—The proof of this belongs to philosophy and not to medicine.

“An artificer produces divers works of art. (S. Thos,<sup>84</sup> 65, p. 186.)

“Every creature exists for its own proper art and perfection.” (*Ib.*, p. 184.)

46. In the case of man, He has bestowed upon him the most befitting temperament possible of all in this world, as well as faculties corresponding to all the active and passive states of man. Each organ and member has also received the proper temperament requisite for its function. Some he has made hotter, others colder, others drier, and others moister.

§ 109. “The human body is the most noble of all lower bodies, and by the equability of its temperament is most like the heaven which is free from all contrariety.”<sup>82</sup> (i. 70, p. 178 trans.)

“He gave each thing its limits and all things their disposition.” (*ib.*, ii. 26, p. 49.)

“God makes man after one type and a horse after another; the types of things are manifold in the divine mind.” (*ib.*, i. 54, p. 118).

“Lord, Thou hast ordered all things in number, weight and measure.” (Wisd. xi. 21.)

“There is diversity and inequality in things created—not by chance, not as a result of diversity of matter, not on account of certain causes or merits intervening, but from God’s own intention; in that He willed to give the creature such perfection as it was possible for it to have.”<sup>82</sup> (ii. xlv, p. 108)

We may also quote from the Chinese.—“All beings possess the five imponderables, but only man has them in perfect balance as the constitution of his Nature.” “That which differentiates man from the brute is his possession of the Mean or Equilibrium, that perfect balance of the elements in the constitution of his Nature of which Tzu-Ssu teaches in his famous classic—the Doctrine of the Mean.” (Chu Hsi,<sup>11</sup> 214, 217.)

“In the life of men and other creatures, the Nature with which they are endowed differs from the very beginning in the degree of

its perfection. But even within the differing degrees of perfection there is the further variation in respect of clearness and translucence." (Chu Hsi,<sup>10</sup> i., p. 57.)

"When the ether received is limited, the immaterial principle received is also correspondingly limited. Thus, the physical constitution of dogs and horses being as it is, their functions are correspondingly limited in their range." (*ib.*, p. 60.) "Man receives the ether in its perfection, and the ethical principle permeates it completely and without impediment; while in the case of other creatures, in which it is imperfect, the ethical principle is impeded and unintelligent. He receives the ether of the universe in its perfection, and therefore possesses moral and intellectual faculties." (p. 67.)

"In birds and animals, though they possess the Nature, it is restricted by the corporeal element, which creates an impenetrable barrier" <sup>10</sup> (p. 61.)

**47. In order of degree of Heat.**

1. The Breath is the hottest, and the heart in which it arises.
2. The Blood. Though this is generated in the liver, it derives more of its heat from the heart than from the liver, the two organs being in continuity.
3. The liver, which may be looked upon as concentrated blood.
4. The "flesh," which would be as hot as the liver were it not for the nervous tissue (cold temperament!) which pervades it.
5. The muscles which are cooler than the "flesh" because of their tendons and ligaments, as well as the nerves.
6. The spleen. The faex of the blood makes this colder.
7. The kidneys contain relatively less blood.
8. The walls of the arteries. These are warm in spite of the nerve substance present, because they receive heat from the blood and the breaths within them.
9. The walls of the veins, which owe their heat to the blood alone.
10. The skin of the palms and soles.

**48. In order of degree of Coldness.**

1. The coldest thing in the body is the serous humour.—
2. Next in degree, the hairs.—3. The bones.—4. The Cartilage.—5. The ligaments.—6. Tendon.—7. The membranes.
8. The nerves.—9. The spinal cord.—10. The brain.—11. Fat.—12. The oil of the body.—13. The skin.

(In general, organs rich in blood are of hot temperament; those poor in blood are of cold temperament.—Aegineta.)

**49.** In order of degree of Moisture.

1. The serous humour is the most moist constituent of the body.—2. The blood.—3. The oil.—4. The fat.—5. The brain.—6. The spinal cord.—7. The breasts and testicles.—8. The lung.—9. The liver.—10. The spleen.—11. The kidneys.—12. The muscles.—13. The skin.

The order here given is that of Galen, but in the case of the lung the moisture is not inherent in its nature but is derived from the nourishment which comes to it. The lung is fed by a very "hot" blood, because there is much bilious humour in the blood going to the lung. A great excess of moisture accumulates in the lung from the gaseous products of the whole body as well as from the materials which flow down to it from the "head."

In actual fact the liver is intrinsically moister than the lung, whereas the lung is as it were constantly sprinkled with moisture ; it is the fact that the moisture lingers in it that makes it so soft (to the feel).

One should conceive of the states of the serous humour and blood in a similar way. The serous humour is moist in that it is as it were sprinkled with moisture. In the case of the blood the moisture interpenetrates, pervades, and grows through its very substance. It is true that the serous humour, watery in nature, generally possesses much more moisture in itself than the blood does. And if the digestive changes in the blood proceed inadequately it loses not a little moisture—namely, the moisture of the naturally watery serous humour, which has become part of the blood. As we shall see later, the normal serous humour is nothing more than imperfectly digested blood.

**50.** In order of Dryness.

1. The driest thing in the body is the hair, for this comes from the ethereal element carrying up with it the material dispersed to it from the rest of the body, which is then left behind in the hair as pure fumosity.

2. The bone. This is the hardest of all the members. It is however moister than hair, because bone is derived from the blood, and its fume is dry, so that it dries up the humours naturally located in the bones. This accounts for the fact that many animals thrive on bones, whereas no animal thrives on hair—or at least it would be a very exceptional thing if hair ever did provide nourishment. Some think that bats can digest hair and live on it. The proof that bone is moister than hair is that when equal weights of bones and hair are distilled in a retort, more water and oil will flow and less "faex" will remain.

3. Cartilage.
4. Ligaments.
5. Tendon.
6. Serous membranes.
7. Arteries.
8. Veins.
9. Motor nerves.
10. Heart.
11. Sensory Nerves.
12. Skin.

The motor nerves are colder and drier at the same time, and are therefore in equipoise. The sensory nerves are colder but not drier in proportion, and are probably very nearly in equipoise, since their coldness is not very far distant from that of the motor nerves.

§ 110. *Link between soul, passions, temperament.* S. Thomas<sup>84</sup> writes (ii. 63, p. 166): "The soul rules the body, and curbs the passions that result from the temperament. For by temperament some are more prone than others to desire or anger, and yet refrain more from these things."

### 3. THE TEMPERAMENTS BELONGING TO AGE

#### SEX, PLACE OF RESIDENCE, OCCUPATION

51. There are four periods of life.

Period.	Title.	Name.	Years of age.
I.	The period of growth.	Adolescence.	Up to 30.
II.	The prime of life.	Period of beauty.	Up to 35 or 40.
III.	Elderly life.	Period of decline.	Up to about 60.
IV.	Decrepit age.	Senescence. Senility.	To the end of life.

In the third period, the best vigour has passed, and the intellectual power begins to decline.

In the fourth period, vigour and intellectual power both obviously decline.

52. The First Period of Life.

Sub-division	Name.	Distinctive Characters.
First.	Infancy	The period before the limbs are fitted for walking.
Second.	Babyhood.	The period of formation of teeth. Walking has been learnt, but is not steady. The gums are not full of teeth.
Third.	Childhood.	The body shows strength of movement. The teeth are fully out. Pollutions have not yet appeared.
Fourth.	Juvenility. "Puberty."	The period up to the development of hair on the face and pubes. Pollutions begin.
Fifth.	Youth.	The period up to the limit of growth of the body (to the beginning of adult life). Period of athletic power.

The temperament during the whole of this period of life is almost equable as regards "heat," but "moisture" is in excess. There has been not a little controversy among older writers about the degree of heat during the period of juvenility as compared with that of youth. Some argue that the heat is greater in the former than the latter, and that this accounts for their growth, and for the fact that their natural functions of appetite and digestion are greater in vigour and persist longer. This, it is considered, is due to a condensation of the innate heat derived from the sperm.

**53.** Others argue that the innate heat of youth is far greater than that of juvenility, because (*a*) their blood is much more plentiful and is thicker—evidenced by the frequency with which nose-bleeding occurs ; (*b*) their temperament approaches that of bile, whereas that of juvenility approaches that of serous humour. (The evidence of an undue proportion of bilious humour in a temperament is (i) that the diseases in such a person are "hot"—e.g. tertian fever ; (ii) the vomitus is bilious ; (iii) other facts.) (*c*) The movements of the body are more energetic in youth ; and bodily movement requires plentiful innate heat. (*d*) Digestion is better and more vigorous ; and this entails expenditure of heat. The signs of a vigorous digestion are : absence of feeling of nausea ; absence of fermentative vomiting ; absence of crudity or aversion to food. These occur in juveniles when their digestive power is disturbed. (*e*) The appetite is less in youth than in juvenility. This shows that the innate heat is greater, for the appetite is better in a cold temperament. A dog's appetite is often accounted for by cold tempera-

ment. (f) The process of growth, greater in juveniles, requires adequate moisture rather than heat. (g) The diseases to which juveniles are liable are usually cold and moist ; and when fevers occur in them, they are pituitous. If vomiting occurs it is usually serous.

These then are the two theories and the facts on which they are based.

54. *Galen's teaching.*—Galen is opposed to both. In his opinion the heat is actually the same in each. The difference is that in puberty its quantity is great but its acuity is less. In youth the heat is less in quantity but greater in acuity. As he says—let us imagine first a single measure of “heat,” or a subtle body of unit heat, penetrating into an abundance of moist substance—as it might be, water. Then imagine a unit of heat penetrating into a small bulk of stone. The heat in the water would then be large in quantity but soft in quality, whereas the heat in the stone would be less in amount but of great acuity. This is analogous to the state of affairs in regard to the heat of juvenility and of youth.

55. Juveniles derive their (innate) heat from the sperm, which is very “hot.” This initial innate heat is being steadily used up, but the loss is made up by the progressive growth ; indeed it is more than made up.—But during the period of youth, there is nothing to make good such loss of innate heat. On the contrary, the degree of innate moisture is lessening both in quantity and quality,—this being the mechanism by which the innate heat remains at a constant level up to senescence. Ultimately, the moisture is in too small a proportion to enable the innate heat to be maintained constant. During all this period there is no corresponding growth.—At the outset of life, the innate moisture suffices for the two requirements—maintenance of innate heat ; growth. But there comes a time when one or other or both must fail. Innate heat must be adequate to enable growth to take place, yet the basis of growth—innate moisture—is failing. So how can growth possibly continue ? It is clear then, that growth must cease, for it cannot be that the innate heat should be sacrificed. This is “the tongue of the case”<sup>104</sup> (iii. 347) during the period of youth. (p.)

56. As regards the second theory—that during juvenility growth is in virtue of moisture rather than in virtue of heat—This cannot be true because moisture (*m*) is the material cause of growth and *m* does not unfold or construct itself ; it is not a self-created “being” : it only changes in virtue of a formative power

(*f*) acting upon it. As a matter of fact this formative power is *F*—the “soul,” or “nature”—that which is in the decree of Allah (*‘umr-i-Allah*). This “nature” requires an instrument wherewith to work, and this instrument is the innate heat.

57. So, when people assert that the voracious appetite of juveniles proceeds simply from their cold temperament, this also is wrong. A morbid appetite due to coldness of temperament cannot result in good digestion and nutrition. As a matter of fact the digestion during the age of juvenility is usually of the very best. Growth of the body as a whole implies that more food is being assimilated than is used up. When digestion is faulty, the cause is either (*a*) gluttony, eating food voraciously or inordinately; or (*b*) errors of diet—partaking of a diet badly designed and including articles of food which are unwholesome, or moist in temperament, or in excess; (*c*) neglect of the movement of the bowels and other emunctories, whereby effete matters accumulate and become knit together in them (which is an indication for purging)—(*d*) other emunctories: the lungs especially need “purgation” by making the respiration deeper and quicker; although its power is never as great as it sometimes is in the second period of life.

This completes Galen’s teaching about the temperaments of juvenility and youth.

58. One must also bear in mind that the innate heat of the body begins to fail after the prime of life, because the ambient air dries up the moisture of the body—and the moisture is *m* of the body.\*

The innate heat also helps to dry up this moisture. So also does the effort involved in the performance of the corporeal and emotional activities inevitably associated with life.

59. Drying up of the moisture is also aided by the failure of the “nature” to withstand the steadily and silently increasing dissipation of the faculties. All the faculties of the body are finite in duration, as is well-known to natural science. So also the innate heat is not being replaced for ever. Even were the innate heat infinite in duration and always bringing about its changes in the body, so as to maintain a renewal equal to the loss, the fact that the loss is increasing steadily day after day inevitably leads to a limit beyond which the loss could not be made good. A fixed state of dryness would be bound to come. How much sooner would not this time arrive did both factors contribute simultaneously towards it?

\* The body is admittedly 95 per cent. water!

60. We see then that the *m*, the moisture of the body, must inevitably come to an end, and the innate heat become extinguished—and the sooner if another contributory factor to its destruction be present; to wit, the extraneous excess of humour arising out of imperfect digestion of food. This extinguishes the innate heat (*a*) by smothering it, enclosing it, and (*b*) by providing the contrary quality. This extraneous humour is called the “cold serous humour.”

61. This is the death of “nature” to which every person is destined, and the duration of life depends on the original temperament, which retains a certain degree of power to the end by fostering its intrinsic moisture. This is the person’s appointed end, and the diversity of temperaments accounts for the different durations of each one’s life. These are the natural terms of life. (There are of course, also, premature deaths, brought about through other causes, though even these are also in accordance with Divine Decree.)

“All things have We created after a fixed decree.” (Q. 54, 49.)

“The four elements are as birds tied together by the feet;  
Death, sickness and disease loose their feet asunder.  
The moment their feet are loosed from the others,  
The bird of each element flies off by itself.  
The repulsion of each of these principles and causes  
Inflicts every moment a fresh pang on our bodies.  
That it may dissolve these composite bodies of ours,  
The bird of each part tries to fly away to its origin;  
But the wisdom of God prevents this speedy end,  
And preserves their union till the appointed day.”

Mesnavi, 57 p. 162.

§ 111. The “death of nature” may also be explained on the basis of *urooj* and *nasool* (§§ 105, 137), for when the positive and negative phases in the cycle of the elements and of the breath clash—that is, enter the phase of *kemal* (Persian term) the bodily functions all cease. The *kemal* phase may be reached long before the allotted span.

§ 112. The presence of this phase, and its probable duration before death actually occurs, may be discerned in practice, if the law be understood. This fact throws a significant light on the statements in the Chinese work on the pulse,<sup>98</sup> where the time of death is foretold from the study of the pulse and other factors—assigning not a number of hours, or days, but a particular period in the lunar cycle. Chu Hsi,<sup>11</sup> in ascribing the varying fortunes of individuals during their life to differences of endowment of Ether (p. 217) betrays a knowledge of the cyclical changes pertaining to body and mind, as well as to the outer world at large.

§ 113. It would be fallacious to argue from this that skil-

ful prognostication of this kind would render medical treatment superfluous. The value of realizing these phases lies in the understanding with which measures are applied in order to tide over the patient during the dangerous period of inertia of vitality, breath, or other factors.

This would not dispense with the constant sense of "*fiat voluntas Tua*," both on the part of the lay and of the profession.

Quotations from the Chinese, for instance, in whom the conception or belief in Fate is vivid and almost dominant, brings no conviction to those many who claim to have no belief in Fate whatever. Nevertheless a few proverbs may be quoted, as expressing the conception usefully: "there is a day to be born, and a time to die"; "before life has been, death has been appointed." "In the beginning it was decided whether one should have long or short life; whether one should have honour or poverty." "The swallow living in the hall does not know the great building is about to be burned." "A physician may cure disease, but he cannot heal Fate." "The lucky physician sees the patient at the end of the disease; the unlucky physician sees the patient at the beginning of the disease." (Plopper,<sup>76</sup> chap. xi.)

No doubt where a possibility of "destiny" is to be admitted for one form of circumstance, the application of the same principle to many details of human life is not so readily conceded; That it is allowable for much more than is customarily accepted will be credible when the existence of occult and inscrutable chains of causes or attractions operating together is realized.

Fate is supposed by some to be blind; by others to be the decree of a far-off Potentate. It is neither. It is the manifestation of a series of combinations of conditions which by "natural" courses of sequences operate in the individual human life. Everyone shares in the weaving of his own web. The web is a by-product in some great scheme which we need not question. Fate ceases to signify for such as rise into the Scheme itself. For, to them, their life is as the throwing of the stone unerringly into the bull's-eye; the intervening events, the *débris*, what of them?

§ 114. Rather than criticize severely the idea of the length of individual human lives being preordained, Anwari<sup>25</sup> rightly asks (p. 54)

"If destiny be not the arbiter of mundane affairs,  
Wherefore are men's states contrary to their wishes?"

"Who, then can say, 'I am an individual, independent and free. I can think what I wish, and I can do what I wish'? You are not doing what you wish . . . thinking what you wish! There are various thoughts around you in the form of men and animals, who influence your mind and feeling and thought; you cannot escape them. . . . There is always some person stronger than you and always someone weaker than yourself. . . . Our lives are tied together and there is a link in which we can see one current running through all." Rosegarden,<sup>38</sup> 1st ed., p. 52.

§ 115. No doubt "destiny" is often supposed to negative

"freewill," which is so much insisted on as man's prerogative. Destiny belongs to the body, freewill to the soul. Or, to be more accurate, it is our Will which is important and not the body, or its length of life. Or, to be still more accurate, by employing the algebraic symbols already fixed on—we are born  $MF$ ; from that moment, with each further reception of (feeding on) sights and sounds or other sense-impressions, we become  $MF'$ . But the purpose of human life has been shown to rise quite beyond this, and our goal is to become  $MF''$  before we die. In each case  $M$  goes into corruption, but the position of  $F'$  and  $F''$  is vastly different.

"The voices of Nature are the mother of the soul."  $F''$  is the outcome of a consistent usage of "freewill" by the Will in a certain direction—namely supernatural, combined also with a "feeding" (to use the same term as above) on supernatural impressions.

To quote from theology, in which domain we are brought, "supernatural" does not refer to superstitions, evil practices, and hypothetical experiences; it is a term used in the sense of "supernatural grace." The ordinary human being is body plus rational soul in the natural order; but it has been intended that he shall be body plus rational soul in the natural order plus soul in the supernatural order (Irenaeus). "There should be no clash between the natural order and the supernatural, for both own God for their Author, and one great function of grace is to supernaturalize the natural life of man by the love of Christ." (O. R. Vassall-Phillips, C.S.S.R.,<sup>96</sup> p. 31, 32.) Wherein lies the importance for a proper attitude by the physician towards his patient, in regard to the serious moments of life (among others), when deceit, equivocation, and concealment of the gravity of the malady are to be deprecated.

62. To sum up, the equable temperament of the period of juvenility and youth is "hot," whereas that of the last two periods of life is "cold." The body in juvenility is additionally of a moist (equable) temperament, in that growth is proceeding; the moistness is shown by the softness of their bones, nerves and other members, and by the fact that at this age it is not going to be long before the semen and ether will come to manifestation. Old persons and those in the "decrepit" age are not only colder but drier in temperament. This is evidenced by the hardness of their bones, the roughness of their skin, and the long time which has elapsed since they produced semen, blood, and the vapor (ether) breath.

The *fiery quality* is in equipoise during juvenility and youth, but the *airy* and *aqueous* quality is more abundant in juveniles. In old persons and in the decrepit, the *earthy* element is more predominant than in the other ages. This element is most marked during the decrepit age.

"Earth says to the earth of the body: return to thy root." (Mesnavi, 57 p. 162).

The temperament of youth is nearer to equipoise than that of juveniles, but, compared with them, its temperament is dry; compared with the third and fourth periods of life, the temperament of youth is moist.

The temperament of the decrepit period is drier than in youth and that of the third period of life in regard to the single members, but more moist than either in regard to extraneous moisture.

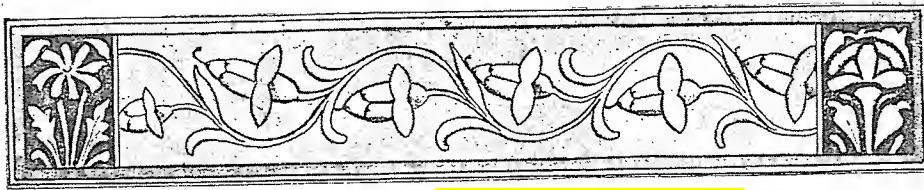
**63. TEMPERAMENT IN RELATION TO SEX.**

The female is of colder temperament; that is why the female is smaller than the male. The female is also moister. The coldness of temperament, as well as the habit of staying at home and taking so little exercise, accounts for the accumulation of excrementitious matters in the female. Their "flesh" is more fine in "substance" (texture) than that of the male, though the flesh of the male is more rarefied in virtue of that which is admixed with it. The denseness of male flesh renders permeation through its veins and nerves more difficult.

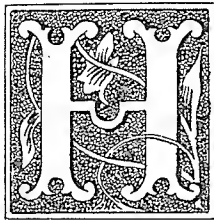
**64. TEMPERAMENT IN REGARD TO GEOGRAPHICAL POSITION.**—The temperament is moister in the peoples inhabiting northerly countries, colder in those living in southerly countries.

**65. TEMPERAMENT IN REGARD TO OCCUPATION.**—The temperament is moister in those who follow a maritime occupation; others are contrary.

**66. THE SIGNS OF THE TEMPERAMENTS** are discussed under the general and special signs and symptoms.



## THESIS IV. THE HUMOURS



**HUMOURS:** *Fluids of the body.* § 116. The word "humour" does not now bear the sense which formerly made it an exact equivalent of *humor*. In German, "Saft" would still apply, but "juice" is unsuitable for the present translation. The term "fluids of the body" has been selected though requiring some qualification. Thus, the humour named "sanguineous" (72), or, simply, "blood," is not to be regarded as identical with the fluid drawn, say by venesection, and studied before or after clotting. The *phlegma* is not properly represented by either "phlegm," "mucus," or "lymph," though having some resemblances to each. "Serous humour" has been preferred to the older "phlegmatic humour." Similarly, "yellow bile" in the Canon may not be restricted to the fluid in a normal gall-bladder; and "black bile" cannot be made synonymous with (black) pathological gall-bladder contents.

Furthermore, it should be said that the "humours" are quasi-material. In many passages of the Canon it would seem that when "matter" is spoken of, in connection with disease, "humour" is often meant, and particularly a morbid humour. But it is also clear that behind the humour there is what Paracelsus would call an "essence," or "radical humour," which itself governs the nature of the humour and whether or not it is going to become morbid. On such a view health depends on the maintenance of the essential humour in a state of purity.

Again, we may say that the blood is the "salt principle" of the body, the serous humour the "sweet principle," the bilious humour the "bitter principle," and the atrabilious humour the "sour principle" of the body. According as one or other of these is predominant in a person, so is his constitution or temperament. In addition to this, the view of the nature of a humour may be extended by suggesting, for instance, that fatty acid is an essential of choleric humour, whereas neutral fat is an essential of sanguineous humour; that sulpho-centric substances are an essential of atrabilious humour.

§ 117. The idea belonging to the doctrine of the humours is not affected by biochemistry or cytology, any more than the theory of "four elements" is really affected by modern chemistry. To retain the idea is to claim a practical value in drawing a distinction between "humours" and the body-fluids. In 101 Avicenna speaks of the blood as a product of the liver, the material for its manufacture being derived almost directly from the food itself. As to the blood-cells,

had he known of them he might justly still regard them as incidentals ; as forces accresced for a time, and always changing in substance. After all, they are importations into the blood ; whatever tissue be their real source, whether their origin is local or widespread, they are not the real trouble in anæmia. Remedies will increase their numbers, but do not touch the real disorder. From Avicenna's point of view, it might be said that the glamour of the revelations of the microscope has only diverted attention from the *real* "sanguineous humour" and its ultimate sources and similar subtleties, thereby leading treatment away to "attacks" on the red and white cell forming organs. For the blood is itself living—not a mere chemical conglomerate. Hence in this field there is a need for reverting to the old paths. The constant endeavour also to reduce everything to terms of cellular individualities, as opposed to one single complex—the human being, the one single *MF*—inevitably carries errors in its train.

When S. Thomas wrote "Health is a harmony of the humours" (*Sanitas est quaedam harmonia humorum*)<sup>81-82</sup> (ii. 64, p. 166) he was so near the truth as to maintain his place even in these days of excessively refined details of knowledge.

# I.—WHAT A BODY-FLUID (HUMOUR : AKHLAT) IS, AND HOW MANY KINDS THERE ARE.

67. A body-fluid, or "humour" is that fluid moist "body" into which our aliment is transformed.

Healthy, or "good" humour (whether present in the aliment in a pure state or admixed) is such as has the capacity for becoming transformed into actual body-substance, either by itself or in combination with something else. In short, it is that which replaces the loss which the body substance (continually) undergoes.

From the above definition, it is clear that "body-fluid" is not synonymous with "humour." Urine, too, though a fluid, is not a humour.—In a sense, body-fluids are the meeting-places between various opposed forces or elements, and their chemical composition is the mode in which such forces or elements are expressed. In this sense, the term body-fluid does not conform to the wording of the above paragraph.

68. The residue from such, the "superfluity," is called unhealthy or "bad" humour. This is contrary in capacity to the former, and is only exceptionally convertible into good humour. It is proper that it should be expelled from the body instead.

The familiar phrases "good-humoured," "bad-humoured" of modern conversation may not have the same significance to the speakers as they had in Shakespeare's day, but retain their value.

69. Some of the fluids are primary ; some are secondary.

The *primary* fluids of the body are : the sanguineous humour, the serous humour, the bilious humour, and the atrabilious humour.

The *secondary* fluids of the body are :—

(a) *non-excrementitious* :

i. located at the orifices of the minutest channels near the tissues, and thus irrigating them.

ii. permeating the tissues like a dew and capable of being transformed into nutriment as required.

iii. an almost congealed fluid.

iv. a fluid existent among the tissue-elements from birth.

(b) *excrementitious*. “Superfluity.” Forms of the respective primary fluids.

70. As regards the non-excrementitious fluids, these have not yet been subjected to the action of any of the simple members ; not till they reach the tissues for which they are destined, are they changed. (*p*).

Of the four varieties above named, the second moistens the tissues according to the requirements which active movements entail, and it comes into play if there is anything likely to dry up the tissues. The third variety forms a nutriment which will be changed into the substance of the tissues, whether to the extent of entering into their temperament, or to the extent of changing into their very essence, thereby attaining an entire likeness to the member. The fourth type accounts for the continuous identity of the member or of the body throughout life ; it arose with the sperma. It is however true to say also that the semen (both male and female) arises out of the humours.

71. THE FOUR BODY-FLUIDS OR HUMOURS PROPER.

1. The sanguineous humour, the most excellent of all.

2. The serous humour.

3. The bilious humour (lit. “red bile”).

4. The atrabilious humour (lit. “black bile”).

72. THE SANGUINEOUS HUMOUR.

In nature (that is, considered dynamically) the blood is hot and moist. In character it either conforms to its nature or it does not. That is (we may say) it is “normal” or “abnormal.”

*Normal* "blood" is red in colour, has no unpleasant odour, and has a very sweet taste.

When blood is *abnormal*, it is either (*a*) because the good temperament has become intrinsically altered or vitiated—i.e. has become colder or hotter; but not from admixture with any foreign matter, or (*b*) because an unhealthy body-fluid is admixed with it. This may happen (*i*) by an unhealthy fluid coming to it from without, penetrating it and so causing decomposition in it, or (*ii*) by a putrescent change in a portion of itself—the rarefied product becoming bilious humour, and the denser product becoming atrabilious; either one, or both together, may remain in the blood. Abnormal blood of type (*i*) is named according to (*a*) that which is admixed with it—whether serous humour, or atrabilious, or simply bilious fluid. That of type (*ii*) is named according to (*b*) its colour and wateriness—sometimes it is turbid, sometimes attenuated, sometimes very dark from much blackness, sometimes pale, (*c*) taste and odour—bitter, salt, or sour.

§117a "Blut ist ein ganz besondrer Saft."

The blood may well be regarded as comprising: sanguineous humour, corpuscles, the canalicular system of the whole body, and the tissue-elements abutting thereon; that is, as including the lymphatic channels and their floating cellular population. In addition, there are the blood-forming centres, which are the meeting-point of two vitalities—the livingness of the blood and the livingness of the tissues. The hæmopoietic centres are foci disseminating "vital force," as also are the endocrines, the abdominal ganglia, etc. The energies so well-known as chemical, physical, osmotic, etc., are not primary, but conversions from the living force of these centres. When the blood changes, or its cell-formula changes, it is because the vital force is changing its mode: instead of radiating in one way, it is disintegrating in other ways, and it involves some one organ more than usual. The balance of action on organs, and the balance in interchange now ceases to be "just," and the organ or organs concerned therein are then apt to receive the brunt of the physician's attention.

### 73. THE SEROUS HUMOUR.

In nature, this is cold and moist. We describe a normal form and an abnormal.

*Normal* ("sweet") serous humour is such as is capable of transformation into blood at any time, seeing that it is in fact an imperfectly matured blood. It is a sort of "sweet"\* fluid which is not in too cold a state; that is, it is cold compared with

\* We may note that it is still correct to call a discharge "sweet."

the blood and bilious humour, but hardly at all cold compared with the body as a whole. A "sweet" serous humour may change into one which is insipid, and abnormal, as we shall describe presently. This happens when there is normal blood admixed—as occurs often in catarrhal exudates or discharges, and saliva.

Sweet serous humour (lymph) has no special locus or receptacle in the body, any more than the two bilious humours have. Yet the serous humour resembles blood closely in this that it is equally necessary for all tissues, who receive it along with the blood.

The tissues absolutely require serous humour for two reasons—one being essential, and the other accessory.

The *essential function* is two-fold: (a) that it should be near the tissue (cells) in case they should be deprived of their habitual nutriment (viz., healthy blood) by reason of retention of the material in the stomach or liver from some cause. This material is normally acted upon by the vegetative faculties, which change and digest it and are themselves maintained thereby. The transformation of lymph into blood is achieved by the innate heat. Alien heat would only putrefy the material and decompose it. This kind of relationship does not obtain in the case of the two bilious fluids, because neither of them turns into blood at any time, as the serous humour does, under the influence of the innate heat; but they resemble the serous humour in undergoing putrefaction and decomposition under the influence of "alien" heat.\*

(b) it must be admixed with sanguineous humour before it can reach and nourish tissues of lymphatic temperament. When the serous humour is present in the blood for subserving nutrition, it must be in definite proportion before it reaches the parts to be nourished; e.g. the cerebrum. It is the same in the case of the two bilious humours.

The *accessory function* is that of moistening the joints and tissues and organs concerned in movement, for otherwise the heat of the friction of the movement would produce dryness of their surfaces. This function is within the range of necessity.

\* For "alien heat" we should now read "bacterial infection."

## 74. TABLE OF FORMS OF SEROUS HUMOUR.

*i. Normal.*

Sweet.

*ii. Abnormal**A.—ARRANGED ACCORDING TO THE TASTE.*

No.	Description.	Remarks.	Temperament.
1	Sweet.	(i) Outcome of action of the vegetative faculties ;	Hot and moist.
2	Salt.	(ii) Due to admixture with blood.	Hot and dry.
3	Acid or Sour	Due to admixture with bile, "bilious serous humour."	Cold and dry.
4	Bitter	(i) Intrinsic in origin ;	
		(ii) due to admixture with acrid atrabilious humour.	
5	Inspid.	(i) From undue infrigidation ;	
		(ii) from admixture with atrabilious humour.	
		Attenuated serous humour.	Cold and moist

*B.—ARRANGED ACCORDING TO ESSENTIAL NATURE.*

No.	Description.	Remarks.
6	Watery.	Attenuated serous humour. This may be salty if there arise in it some sort of putrescence.
7	Excrementitious or Mucilaginous.	A superfluity of foreign nature, and evident as such to the senses as a mucilaginous material.
8	Crude.	This is a subvariety of the preceding ; to the senses it appears to be the same as the preceding, but actually is different.
9	Vitreous.	Glasslike in texture ; taste sometimes sour, sometimes absent.
10	Calcareous.	Opaque white. Denser than the "crude" form. The attenuated part has been dispersed ; that which is denser than all the others therefore lingers too long in the foramina and joints.

(This table is constructed out of the statements in the text in conjunction with the table devised by Joannitius<sup>44</sup>). The additional matter does not therefore follow the same order as the Latin text, though including all the information therein.)

*The abnormal forms of serous humour (see also 74).*

75. *Salty serous humour* (No. 2 in table), is warmer, drier and lighter than any of the others. It is salty because oxidized earthy matters of dry temperament and bitter taste are admixed with the watery (nearly or quite inspid) "moisture," in equal proportions. I say "equal" (i.e. in potency, not weight. Tr.) because if the earths were in excess, the taste would be bitter rather than salt. The same sort of process accounts for the origin of the salts in all the salty waters found in Nature.

76. Salts may be obtained artificially also, by boiling ashes, soap ashes, or chalky matter, etc., in water. Then strain.

The salt will then separate out from the water, either at once, or on standing.

**77.** *Attenuated serous humour* (No. 5, 6) is similar. This may be insipid or have only a slightly salt taste. This taste results from the admixture with an equal amount of oxidized bile, which is dry and bitter; and the resultant heating salty fluid is called "bilious serous humour." Though Galen believed that this kind of serous humour owed its saltiness to admixture with putrescence or wateriness, my teaching is that the putrescence makes it salty by setting up oxidation in it, in consequence of which an "ash" becomes admixed with the moisture. Aquosity by itself is insufficient to render serous humour salty; some other factor must be present, either as well or on its own account.

**78.** Serous humour (No. 4) becomes *bitter* if (i) atrabilious humour (which is bitter) be admixed with it, or (ii) too much infrigidation takes place, whereby the taste changes from sweet to bitter.

The process consists in a congealing and degradation of the watery element into something dry, and therefore earthy in character. The degree of heat is too small to ferment it and make it sour. A strong heat would completely alter it (into something else altogether).

**79.** *Sour or acid* (No. 3). As in the case of sweet humour there are two forms—one where the sourness is intrinsic in origin; and one where it is introduced from without. In the second case it is acrid atrabilious humour that is the extraneous factor. We shall speak of it later. When the sourness is intrinsic, it is comparable with the change that takes place when the other juices go sour. In other words, it is sour because the humour has fermented and then gone sour.

**80.** No. 6. See under No. 2. (No. 7 and 8 are described in the table.)

**81.** The *vitreous* kind of serous humour (No. 9) is dense and closely textured, and resembles glass in viscosity and weight. It is sometimes sour to the taste and sometimes tasteless.

When a humour like this is closely textured and insipid, it either is "crude," or changes into a crude serous humour. The vitreous humour was originally a watery humour, and "cold"; and remained so without undergoing putrescence, or having any other thing admixed with it. All this time it is not manifest to the senses. It becomes evident only when it thickens in texture, and develops coldness.

## 3. THE BILIOUS HUMOUR.

In nature this is hot and dry. It also occurs in a normal and an abnormal form.

**82.** *Natural bilious humour* is the "foam" of blood. It is bright red in colour. It is light and pungent. The redder its colour, the hotter it is. It is formed in the liver, and then pursues one of two routes—either it circulates with the blood, or it passes on to the gall-bladder. The part which passes into the blood-stream subserves two *purposes*—(i) it enables the blood to nourish those certain tissues or organs which need the presence of a suitable amount of bilious humour in a dispersed form : as holds in the case of the lung. (ii) a mechanical one. It attenuates the blood (i.e., diminishes its surface tension !) and thus enables blood to traverse the very minutest channels of the body.

The part which passes to the gall-bladder subserves two purposes : (iii) the removal, in this form, of a certain portion of the effete matter of the body. In so doing it nourishes the walls of the gall-bladder.

(iv) a dual *function* (a) it cleanses the food-residues and viscous serous humour from off the walls of the bowel, (b) it stimulates the muscles of the (lower) intestine and anus, thereby enabling them to perceive when it is necessary to go to stool.

**83.** Any obstruction to the flow of bile from the gall-bladder through the duct into the intestine is liable to cause colic.

**84.** *Types of Bilious Humour.*

Group.	Variety.	No.	Description.	Site.	Origin.	Quality.
A	Normal.		Clear and pure	Liver ; blood	Foam of blood.	Hot.
B	Abnormal by admixture with alien substance.	1	Citron-yellow	Liver.	The alien substance is attenuated serous humour (added to A).	Less hot.
		2	Vitelline-yellow, colour of egg yolk.	Liver.	Dense (coagulated) serous humour added to A.	Less hot.
		3	Oxidised bile, type b. It is ruddy-yellow, not transparent, resembles blood, but is tenuous. Various other colours may appear in it.	Liver ; blood	Simple admixture with <i>atrabilious</i> humour.	Less deleterious than 4
		4	Oxidised bile, type a.	Gallbladder.	Spontaneous Oxidation of bile =attenuated part + ash. But this ash does not separate out.	More deleterious than 3.

Group.	Variety.	No.	Description.	Site.	Origin.	Quality.
C	Abnormal by inter- nal change of sub- stance.	5	Hepatic form.	Liver.	<i>Oxidation</i> of at- tenuated part of <i>blood</i> . The denser part of the blood separates out as atrabilious humour.	Mod. toxic.
		6	Leekgreen bile. Gastric type a	Stomach.	<i>Oxidation</i> of vitelline <i>bile</i> .	Less toxic.
		7	Mildew or verdigris green bile. Gastric type b	Stomach.	Intense degree of <i>oxidation</i> of vitel- line <i>bile</i> till all moisture is lost.	v. hot, extremely toxic.

No. 7 is possibly derived from No. 6 by an increase in the degree of oxidation, whereby all the moisture is dried up. The fact of becoming too dry accounts for the whitish colour. For we know that when heat is applied to a moist substance, it first turns black, until all the moisture has vanished, and after that the blackness changes into whiteness. When the moisture is less than half and half, whiteness begins to be visible. Thus, wood is first charred and finally becomes a white ash. Heat applied to a moist body makes it black; applied to a dry body it makes it white. Cold applied to a moist body makes it white, and applied to a dry body makes it black. Such is our opinion about the leekgreen and verdigris-green biles.

Verdigris-green form of bile is both hotter and more depraved, and more deadly than all other kinds of bile. It must therefore be classed as one of the toxic substances.

#### 4. THE ATRABILIOUS HUMOUR.

**85.** This is cold and dry in nature. There is a natural or normal form of this effete substance, and also an abnormal or morbid form.

**86.** The *normal* form is the "faex", or sediment of good blood, an effete matter. In taste it is between sweetness and bitterness. It arises in the liver and then divides into two portions, one of which enters the blood, and the other goes to the spleen.

**87.** The portion which enters into the blood subserves two *purposes*. (a) It takes parts in the nourishment of those members which need a trace of atrabilious humour to complete their

temperament. Ex.: the bones. (b) It bestows stamina, strength and density and consistence upon the blood.

88. The portion which passes to the spleen is such as is no longer of any use to the blood. Its *primary use* as regards the body as a whole is that it clears the body of so much effete matter. Its use in regard to one special organ is that it supplies nourishment to the spleen. Its *secondary use* is that by travelling to the mouth of the stomach by a sort of milking movement, (a) it gives it tone and makes it tighten up and thicken, (b) its bitterness irritates (tickles) the mouth of the stomach and sets up a sense of hunger and so arouses the appetite.

89. You must remember that the part of the bilious humour which passes to the gall-bladder is something no longer needed by the blood, and that the part which emerges from the gall-bladder is something no longer needed by that either. It is much the same with the atrabilious humour. That part which goes to the spleen is such as is no longer needed by the blood, and that part which emerges from the spleen is such as is no longer needed by the spleen.

And besides that, just as the bilious humour, in passing through the intestine, arouses peristalsis and so helps to get food away from the stomach, so the atrabilious humour passing from the spleen arouses appetite and leads to the drawing in of food down into the stomach.

Wherefore thanks be to Allah the best Artificer of all things, and unending the praise.

90. The *abnormal form* of atrabilious humour is not a sort of precipitate or "faex"; it is really a form of oxidized material, or ash formed from an oxidation of the commingled bilious humour. Thus, when moist things are admixed with earthy ones, the earthiness separates out (1) as a sediment. This is exemplified in the case of the blood, of which normal atrabilious humour is a sediment. (2) as an ash, or oxidation-product. In this case the rarefied portion disperses and the dense portion remains behind. This is exemplified in the humours, of which excrementitious atrabilious humour is the segregate.

91. Blood is the only body-fluid which yields a precipitate of this kind. Serous humour does not do so because of its viscosity; it behaves like oil. Bilious humour does not do so because it is attenuated and is deficient in earthy matters, and it is also constantly moving. This is because the blood separates out only very little; nothing which needs attention; besides, if a substance should separate out, it would soon putrefy or be

expelled from the body. If it putrefied, the attenuated part would disperse, and the denser part remain behind. It is this denser unprecipitated part that is the oxidized atrabilious humour.

The abnormal atrabilious humour is hotter and lighter than the natural form, and it has in itself a strong penetrative power of moving from the upper parts to the lower, and also a destructive action (Joannitius).

**92.** *Excrementitious atrabilious humour* is of four kinds :  
 (a) the ash derived from bilious humour. This is bitter. The difference between this and oxidized bilious humour is that in the latter the ash is only admixed, whereas in the other the ash separates out after dispersal of the attenuated portion ;  
 (b) the ash derived from the oxidation of serous humour. The ash becomes salty if the serous humour is too attenuated and watery; otherwise the ash is acid or bitter ; (c) the ash derived from the oxidation of sanguineous humour. This is salty and faintly sweet ; (d) the ash derived from normal atrabilious humour. If this humour be attenuated, the ash will be very acrid, like vinegar. That is, when vinegar (and the like) is sprinkled upon the earth it "boils" and acquires an acrid odour, so that flies and insects of all kinds shun it. If the atrabilious humour were dense the ash will have less acrimony and be only slightly bitter.

**93.** There are three kinds of morbid atrabilious humour :—  
 (1) Oxidised bilious humour, whereby the attenuated portion is removed. There are two varieties of this.

**94.** *Injurious Actions.* (2) *Sero-atrabilious humour* is less injurious and acts at a slow rate. (3) *Choleric-atrabilious humour* is more injurious, and undergoes decomposition very readily.  
 (a) This form is more amenable to treatment than the other.  
 (b) There is another form which is more acrid, and more injurious. Still, if treatment be begun more early, it will be more quickly amenable thereto. (c) A third form effervesces less when dropped upon earth and penetrates the tissues less easily, and is more slowly destructive. On the other hand it is very difficult to disperse, or mature or treat by any remedial measures.

These then are the several kinds of normal and excrementitious humours.

95. Galen regards the blood as the only normal body-fluid, for he considers that all others are excrementitious and quite useless. But if the blood were the only nourisher of the various organs of the body, it would be as much as saying they are all alike in temperament and nature. Bone would not be harder than flesh were it not for the hardness in the atrabilious humour present in the blood. Brain would not be softer than the flesh were it not for the presence in the blood of the soft serous humour which nourishes the brain. So we conclude that in the blood there are other humours, which leave it (in the various organs).

96. Moreover, we see how when blood is withdrawn into a vessel, it contracts and allows various portions visibly to separate out—a foam (the yellow bile), a turbid faex (the atrabilious humour), a part like egg-white (the serous humour), and a watery part (the aquosity), which passes out through the urine. One does not count the aquosity among the body-fluids because it is not a nutrient, even though it is true it is taken in as drink. Its purpose is to dilute the aliment and enable it to permeate the tissues. A humour, on the other hand, is a nutrient, derived from both food and drink. By the word "nutrient," I mean that which is assimilable into the likeness of the human body—a complex substance, and not a "simple" body. Water, of course, is a "simple" body.

\* \* \*

97. Some think that strength of body depends on abundance of blood ; that weakness is associated with paucity of blood. But it is not so. It is rather this, that the state of the body determines whether the nutriment will be beneficial to it or not.

Others again, believe that whether the humours be increased or lessened in amount, the maintenance of health depends on the preservation of a certain quantitative proportion between the several humours, one to another, peculiar to the human body. But that is not exactly correct. The humours must, besides that, maintain a certain constant quantity. It is not a matter of the composition of one or other humour, but of (the body) itself ; but the proportions which they bear one to another must also be preserved.

98. I purposely omit referring to certain other problems relative to the humours, because they pertain to philosophy and not to medicine.

Tentatively to draw up correlations between modern biochemical data and the humours as above described would not be quite a useless exercise. From the description, it is clear that any given sample of blood contains : (1) all four normal

humours; (2) a certain proportion of immature humours—that is, under-oxidised digestive products; (3) excrementitious humours—the tissue-wastes or effete substances; the by-products of complete oxidation. In diseased states, it may also contain (4) certain depraved humours, including (a) over-oxidised products; (b) putrefactive substances of various kinds.

To (1) belong: as regards the sanguineous humour—serum-globulins and serum-albumen, neutral fat, glucose, and the salts concerned in maintaining the acid-base equilibrium; as regards the bilious humour: bile-pigments, cholesterol, and perhaps lecithin and volatile fatty acids; to atrabilious humour: neutral sulphur, nitrogen compounds when in colloidal form, certain mucoids.

To (2) belong: glycogen, animal gum, soaps, various salts. To (3): the non-protein-nitrogen group (urea, ammonia, creatinin, etc.) To (4): the products of bacterial growth, various auto-intoxications, diamines, etc.

To complete the correlations, some idea should be formed as to the morphological place to which the substances are severally to be assigned, as doubtless the humours occupy blood-corpuscles and other particulate components of the blood.

## 2. THE MODE OF ORIGIN OF THE FLUIDS OF THE BODY.

**99.** Aliment undergoes a certain amount of digestion during the act of mastication. The lining of the mouth being continuous with that of the stomach, there is as it were one continuous digestive surface. When that which has been masticated comes in contact with it, a certain change at once takes place in it—namely under the influence of the saliva, whose action, in virtue of the innate heat within it, is digestive. That is how it is that when wheat is masticated it procures the maturation of furuncles and abscesses, but has no such effect when simply rubbed with water, or even if boiled with water.

Some assert that the sign which shows us that food is already beginning to be altered after mastication is that prior to this act there is neither odour nor taste in it.

**100.** Once the aliment has entered the stomach, true digestion goes on—not so much by reason of the heat of the stomach as by reason of the heat of the enveloping members—namely:

On the *right*: the liver.

On the *left*: the spleen. This not warm in virtue of its own substance, but in virtue of its blood-supply.

In *front*: the omentum, whose fat easily retains heat and reflects it on to the stomach.

Above: the heart, which warms the diaphragm and so warms the stomach.

**101.** The *first stage of digestion* yields the essence of the aliment, which, in many animals, becomes “chyle” by the help of admixture with the fluid which one has consumed. The chyle is of the consistence of a ptisan (broth), that is, as thick as sodden barley.

**102.** The portion of this chyle which is thus diluted is drawn from the stomach into the intestines, and then is caused

to enter into the roots of the mesenteric vessels which are found all along the intestinal tract. These vessels are slender, and firm. Having entered these channels the nutriment passes into the portal vein, enters the gateway of the liver, and then travels along finer and ever finer divisions until it comes to the capillaries (lit., the very fine hair-like channels), which are the ultimate source of the vena cava emerging from the convexity of the liver.

The passage of the nutriment through these very narrow channels could not take place were it not admixed with water consumed in excess of the strict requirements of the body.

By being distributed over the whole liver in this way, the chyle is exposed to the digestive function of the whole organ, and the function of the liver is thus accomplished most vigorously, energetically, and speedily. The change of nutriment into blood is now complete.

**103.** The various products and by-products of digestion up to this point may be tabulated as follows (*p*) :

TABLE OF DIGESTIVE-PRODUCTS.

- (a) In *healthy digestion*—
  - (i) the blood itself.
  - (ii) By-products :
    - (a) a foam .. .. the bilious humour.
    - (b) a sort of precipitate .. .. the atrabilious humour.
- (b) In *unhealthy digestion*—
  - (iii) By-products :
    - (c) An oxidation product, where digestion is carried too far :
      - 1. Attenuated portion .. .. morbid bilious humour.
      - 2. Dense portion .. .. morbid atrabilious humour.
    - (d) A product when digestion is not carried far enough .. .. serous humour.

**104.** As long as it stays in the liver, the blood which the liver forms is more attenuated than it should be, because the wateriness is in excess, for the reason already given. But when the blood leaves the liver the excess of water is removed, for it is taken to the renal vessels, and so provides the kidneys with the quantity and quality of the blood best suited for their nutrition. The “fat” of the blood nourishes the kidneys, and the superfluous wateriness and a certain degree of sanguineous material passes down to the bladder and so away from the body.

**105.** The good blood ascends into the superior vena cava, and its subsequent course is into smaller and smaller veins : and finally into the finest hair-like channels. Having reached these hair-like channels it “sweats out” through their orifices and bathes the tissues, according to the decree of Allah.

## 106. TABLE OF THE CAUSES OF HUMOURS.

Name of Cause.	Blood.	Bilious Humour	Serous Humour.	Atrabilious Humour.
Material Cause.	Those parts of the solid and fluid aliment which are of equable temperament.	The attenuated hot, sweet, oily and sharp by-product of aliment.	The dense humid, viscid, cold by-product of the aliments.	The very dense by-product of the aliments, very deficient in moisture, and exceeding in heat.
Formal Cause.	Exact and good digestion.	Digestion verging on excess.	Imperfect digestion.	Precipitative tendency, preventing the flow or dispersal.
Efficient Cause.	Attempered heat.	Attempered heat, for normal bilious humour ('foam'). Undue heat, for abnormal bilious humour. Site: liver	Feeble heat.	Medium heat; i.e., a heat of oxidation which surpasses the limits of equipoise.
Final Cause.	To nourish the body.	Primary: nutrition; attenuation of blood. Secondary: cleansing bowel wall; desire for stool (see 82).	Primary and Secondary purposes named in 73.	Primary and secondary purposes named in 87. Nutrition. Inspissation of blood. Nourishment of spleen. Tone to stomach. Aid to appetite.

## 107. Further details regarding the efficient causes :

I. *Action of heat and cold.* One must not forget that the most fundamental agents in the formation of the humours are heat and cold. When the heat is equable, blood forms; when heat is in excess, bilious humour forms; when in great excess, so that oxidation occurs, atrabilious humour forms. When the cold is equable, serous humour forms; when cold is in excess, so that congelation becomes dominant, atrabilious humour forms.

II. *The faculties.* There is also a proportionate relation between the active and passive faculties (which has to be considered in thinking of the formation of the humours).

III. *The temperaments.* One must not get the idea that every temperament gives rise to its like and never to its opposite. A temperament often gives rise to its exact opposite, indirectly

(of course); it cannot do so directly. A cold and dry temperament may give rise to visible moisture, though this would not be beneficial, but would indicate that the digestion is feeble. A person with such a temperament would be thin, with supple joints, and hairless skin, cold to the touch, the surface veins narrow, and he would be gentle and apprehensive (timid) in nature. He would be like the old person, who makes too much serous humour and is cold and dry in temperament.

**108.** *Circumstances which make the atrabilious humour plentiful.*

- (1) Immoderate degree of heat in the liver.
- (2) Weakness of the spleen.
- (3) A degree of cold sufficient to be congelative and cause marked and long-continued constriction.
- (4) The existence of various long-standing or often repeated diseases whereby the humours are reduced to ash.

When the atrabilious humour is plentiful, it lodges (not literally, but virtually) between the liver and stomach, with the result that the formation of blood and healthy fluids is interfered with, and less blood is formed.

\* \* \*

**109.** *Third digestion.*—The blood and that which circulates with it undergoes a third digestion in the blood-vessels.

This is a truth worth noting. The tissue-foods carried by the blood, and the tissue wastes discharged into it, undergo treatment within it, which is only efficient if certain salts and acid bases are present; otherwise conversion of such substances into available form fails to occur; and deposition in various tissues, fasciæ, and joints, and even in the vessel-walls (atheroma, c.g.) and nerve-sheaths occur with ill effect. These deleterious substances may be thought of as composed of particles too large to permeate the ("invisible") pores of the tissue-boundaries referred to, and the pathological condition of "obstructions" which looms so largely in the Canon here finds its *raison d'être*.

**110.** *Fourth digestion.* When the nutriment has reached the various members, giving each its appropriate "element," a *fourth* digestion takes place.

**111.** *The fate of the residues.* The residues from the first digestion (namely that in the stomach)—pass out by way of the intestines as excrement. Those from the second digestion (namely, in the liver)—pass out chiefly by the urine, though some go to the spleen and gall-bladder. The residues from the other two digestions are discharged partly by the skin as insensible perspiration and external sordes; partly through visible orifices—the nostrils and ears; partly through the invisible orifices scattered over the whole body; sometimes through

unnatural channels in the form of inflammatory matter ; sometimes as appendages like the hair and nails.

If the body-fluids become attenuated, they are readily dispersed and discharged from the body, especially when the pores dilate. The loss of such fluids produces great weakness, not only by the fact of the loss but also by the dispersion and loss of *breath* which (necessarily) occurs simultaneously.

**112.** Lastly, it must be clearly understood that not only the causes of origin, but also the causes of movement of the humours must be taken into consideration.

Exercise and heating agents set in motion the sanguineous humour, the bilious humour, and even the atrabilious humour (which is strengthened thereby). Repose sets the serous humour in motion and strengthens it. Repose also strengthens some kinds of atrabilious humour.

Even imagination, emotional states and other agents cause the humours to move. Thus, if one were to gaze intently at something red, one would cause the sanguineous humour to move. That is why one must not let a person suffering from nose-bleeding see things of a brilliant red colour.

“ Anger, joy, and passions of a like nature are accompanied by a change in the body.” (Sum. Theol. 75, 3 ; p. 11, trans.)

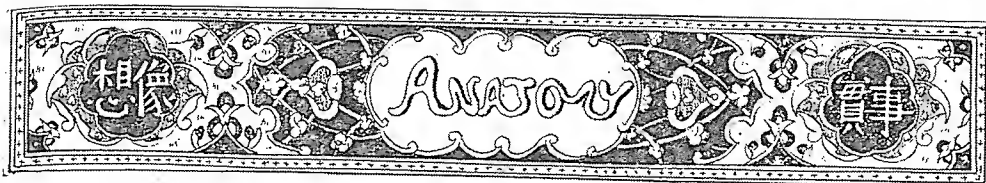
The temper of a cow frequently determines the quantity of the milk it yields, if it gives milk at all. But under the influence of such passions as anger, rage, fury, the milk changes in quality, and develops noxious or poisonous properties. Even the flesh may become poisonous if the animal suffered intensely or protractedly, either mentally or physically. Overdriven cattle may thus yield meat which contains toxic substances injurious to the human consumer (Lindsay,<sup>48</sup> ii. 270, etc.).

*Effects of colours on bodily functions.*—Red and yellow are injurious to the eye. Blue light soothes the movement of the blood, while red light stimulates it. Morning light aids nutrition. Colours vary in their effect according to their intensity. Conversely, darkness benefits various conditions ; it helps to induce inactivity and sleep (Pereira<sup>152</sup> ; Babbitt<sup>151</sup>).

Light in another sense has an effect on the emotions : for instance, the light of intelligence converts fear (earth element) into caution, affection (water element) into benevolence.

**113.** This completes all we propose to say at present about the humours and their mode of formation. There are other aspects of the subject whose discussion and justification pertain to the philosopher.

(See also the composite Chart at the end of the Volume.)



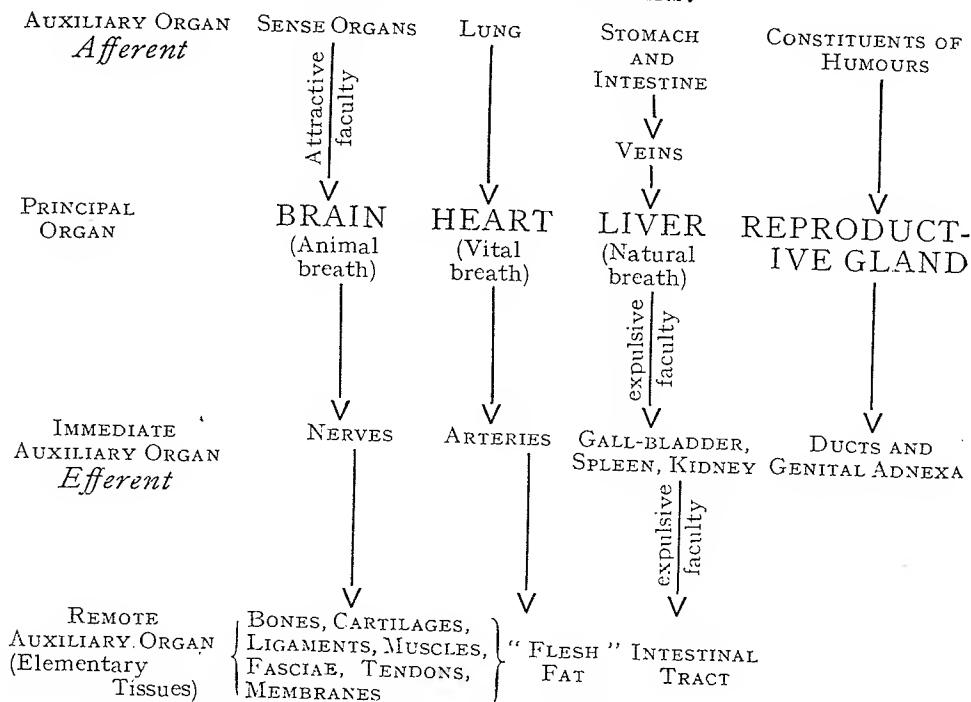
## THESIS V. THE MEMBERS

### I. WHAT A MEMBER IS AND WHAT ARE ITS COMPONENTS

114. The members of the body are derived primarily from the commingling of the humours, just as the humours are derived primarily from the commingling of the aliments, and the aliments are primarily composed of commingled "elements."

115. There are simple members and compound members. The simple members are those whose structure is homogeneous throughout, so that their name describes them in all parts : e.g. flesh, bone, nerves, and the like.\* The compound members are those in which one and the same word is not a correct description of all the parts. For instance, in the case of "hand," "face," —a part of the face is not "face" ; a part of the hand is not "hand." These members are called "instrumental" because they are the instruments whereby the passions and actions of the mind ("soul") are achieved.

TABLE OF THE MEMBERS.



\* Equivalent to the modern term *Elementary tissues*. Cf. "homoïomenous" parts.

## 116. THE SIMPLE MEMBERS (the "elementary tissues.")

"Simple": Cf. the scholastic sense—homogeneous; indivisible. (See § 19.)

1. The *bone*. This is sufficiently hard to form the foundation of the body as a whole, and provide the purchase needed for its movements.

2. The *cartilage*. Being softer than bone, this can be bent, and yet it is harder than all the other members. It was made for the purpose of providing a cushion between the hard bone and the soft members, so that the latter should not be injured when exposed to a blow or fall, or compression. This is shown in the case of the shoulder-blade and the bones over the praecordia, and the ribs; and in the case of the epiglottis and xiphisternum. In the case of joints, it prevents the tissues from being torn by the hard bone. It gives a purchase for a muscle to obtain extension in places where there is no bone to give attachment or support (for instance the muscles of the eyelids), and also gives attachment to muscles without being too hard for them (for instance, the epiglottis).

3. The *nerves*. These are structures arising from the brain or spinal cord. They are white, soft, pliant, difficult to tear, and were created to subserve (a) sensation, (b) movement of the limbs.

4. The *tendons*. These form the terminations of the muscles. They resemble nerves in appearance. They are attached to movable members, and when the muscles contract and relax, the parts to which the tendons are attached move to and fro. They may sometimes broaden when the muscle expands, and then become narrow again on their own account, lengthening and shortening apart from the lengthening and shortening of the muscle. Sometimes this is through the intervention of ligaments. The upper part of the muscle is called "flesh"; that which leaves the flesh and passes to the joint, bringing the two close together, is the "tendon."

5. The *ligaments*. These structures have the appearance and feel of nerves. They are of two kinds: true and false. The latter extends to the muscle. The former does not reach as far as the muscle, but simply joins the two ends of the bones of a joint firmly together. This false ligament has not the feel of ligament, and is not painful when moved or rubbed. The auxiliaries of the ligaments are the structures attached to them, as has been explained.

6. The *arteries*. These structures arise from the heart. They are hollow, elongated, fibrous, and of ligamentous consistence. Their movements consist in expansion and contraction, which distinguishes them from the veins. They were created in order to enable the heart to be ventilated, fuliginous vapour to be expelled therefrom, and the breath\* distributed by their means to all parts of the body.

7. The *veins*. These resemble arteries except in so far as they arise from the liver and do not pulsate. Their purpose is to carry the blood away from all parts of the body.

(As the text stands, it will equally read "to all parts of the body." As we know, the belief was that blood left the heart to all parts of the body, and also left through the veins to all parts of the body. The arteries carried the breath. The veins carried the aliment. The heart therefore drove blood away from it on both sides. The distribution into minute capillaries was known for both series of vessels. But it did not seem to occur that the two flows were in opposite directions, and *that as much went out of the heart as came into it*. The conviction that the two quantities were *not* equal was the real reason for not going on to the truth of the literal circulation. At bottom, it was the equality of the two quantities which Harvey had to prove in order to establish the fact of the circulation.)

8. The *membranes*. These structures are formed of extremely minute interwoven filaments which are extremely delicate. Their object is (*a*) to form the external covering for other structures and thereby (*b*) preserve the form and outline of these structures, (*c*) to support the members, (*d*) by means of their fibres to bind together the nerves and ligaments with the members; for instance they hold the kidneys in position, (*e*) to impart sensation to members which are themselves insensitive, since by providing a sensitive covering they enable the member to be aware of anything befalling it. For instance: the lung, the liver, the spleen, the kidney; all of which are in themselves insensitive, and would not feel being touched were there not a membrane over them.† A flatulent distension or an inflammatory deposit in the organ is felt by us only because the enclosing membrane, being stretched, feels it; or, in the case of an inflammatory mass, is aware of the weight.

9. The *flesh*. "Flesh" includes muscles, fasciae, tendons, ligaments, connective-tissues, and so forth all together. Flesh is that which fills up the spaces left within the members, thus imparting firmness and solidity.

117. In every member there is a natural faculty (the vegetative faculty) which subserves its own nutrition. This

\* Nowadays we would say "oxygen" instead of "breath."

† We know to-day that the viscera are only sensitive to touch and pain via their peritoneal covering (Tr.).

faculty is the power by which attraction, retention, assimilation, union with nutriment, and expulsion of effete matter are secured. Members may therefore be classified accordingly. But besides that, some members possess a further faculty which passes from them to another member, while others have not such a faculty. Other members again have still another faculty which passes into them from another member, and some have not such another faculty.

The following associations may therefore be assumed :—

- (a) receiving and also giving a faculty.
- (b) giving and not receiving a faculty.
- (c) receiving and not giving a faculty.
- (d) neither giving nor receiving a faculty.

**118.** There can be no doubt about the existence of the first-named. All agree that the brain and the liver each receive their power of life, natural heat, and breath from the heart, and that each of them is also the starting-point of another faculty which it sends out to other organs. But there is a disagreement about the second. Thus in the relation between the brain and sensation, is sensation confined to the (literal) brain, or not? In the relation between the faculty of nutrition and the liver, is it integral in the liver, or not?

**119.** Then, too, in regard to the heart. There is a great disagreement between the philosophers and the physicians. The great Philosopher said that the heart is a member which gives and does not receive; that it is the first root of all the faculties and gives the faculties of nutrition, life, apprehension, movement, to the several other members,—whereas physicians (and some of the ancients) considered these faculties to be distributed among several members (the faculty of nutrition in the liver; of vital power in the heart; the mental faculties in the brain); and that hence there can be no such thing as a member giving without receiving. However plausible the physicians are, careful consideration shows that the argument of the Philosopher is much nearer the truth.

“There are the minds of the cells of the liver, and the liver-mind—the mind that regulates the activities of the liver-cells. Above the liver-mind and above the stomach-mind and the heart-mind is the general physical mind; and, above that general physical mind, and also above the intellectual mind is a higher mind still. There is a hierarchy and kingdom within us.”—(Miles,<sup>122</sup> p. 92).

**120.** As to the third association, we consider that there can be no doubt about the fact that some members receive and do not give. Thus, the flesh receives the power of sensation and life, but has not the power of imparting another faculty in return.

121. As to the fourth—there is also a disagreement both among physicians and among philosophers. On the one hand it is thought that the non-sentient bone and flesh and the like could not continue to live unless these powers were residing in them, and that therefore they do not need to receive ;—that the power provided by the aliments conveyed to them is adequate, and that therefore they neither furnish a power for another member nor does another member furnish them with a power. The opposite opinion is that the powers in those members are not residing in them, but are formed in the liver and heart ; and when they reach these members they come to rest within them. There is no means of deciding between the two views by argument but the inability to do so is no hindrance in practice. As to the first of these two views, one must realize that it does not matter whether the heart be the source of sensation and voluntary motion in the brain, or not ; whether the source of the nutritive faculty be in the liver, or not. It is of no significance whether the brain has in itself the source of the powers of the soul, or whether these powers only come by way of the heart. In any case it is only a *relation*. If the liver is the starting-point of the nutritive faculty, that too is only in relation to other members.

Then as to the second of the two views, one must realize that it does not matter whether the natural faculty in a member like bone is innate in it in virtue of its temperament, or whether it arose in the liver first, or whether neither is true. One must rather realize that the faculty could not be there at all were it not for the liver, and that therefore if the path were obstructed the bone would cease to receive the necessary nutriment, and its functions would cease—exactly as holds in the case of movement when some nerve-connection with the brain is severed. There is the natural faculty in the bone as long as its temperament is maintained.

122. The whole discrepancy is removed by regarding some members as principal or vital, some as auxiliary, and some as neither vital nor auxiliary.

123. *Classification of Members into Principal (or, Vital) and Auxiliary.*

The *principal (or, vital) organs* are those in which the primary faculties of the body arise—i.e. the faculties necessary either to the life of the individual or to the life of the race.

“ In the body is a part which being sound the rest is sound, and which being unsound, the rest is unsound. And this is the heart.” (Burton : Night 80).

The principal organs necessary for the life of the individual are three in number :

1—The *heart*, the source or starting-point of the vital power, or innate heat.

2—The *brain*, the seat of the mental faculties, sensation and movement.

3—The *liver*, the seat of the nutritive or vegetative faculties.

The organs concerned in the maintenance of the life of the race are : the three just named, and :

4—The *generative organs*, some of which are essential and others auxiliary. The essential function is that of forming generative elements ; the auxiliary functions are those of giving the masculine and feminine form and temperament. These functions are inseparable from the race, and yet play no part in the essence of life.

The *auxiliary members* are of two kinds : (a) preparative,\* (b) purely or absolutely auxiliary. The former come into operation before the principal members can come into play. The purely auxiliary members come into operation after the principal members have functioned. This is conveniently shown in the following table :

Preparative member.	Member subserved.	Auxiliary member.
Lung.	Heart.	Aorta.
Stomach.	Liver.	Veins.
Liver, with other nutrient members and the guardians of the breath.	Brain.	Nerves.
Testis or ovary.	Generative organs.	Penis and erectile tissues (and ducts.) Female organs carrying the semen to the site of conception. Uterus as perfecter of the virtue of the semen.

\* These are the "adnexa."

124. *Classification of the members according to action.*—

Galen classified the members into those which effect an action (e.g. heart), those which assist the action (e.g. lung) and those which achieve both (e.g. liver). But for my part, I consider as "action" that particular kind of action by means of which a given member accomplishes the maintenance of the person's life or the perpetuation of the species. Thus, the heart gives rise to the breath. Action is assisted when one member is prepared for receiving the action of the other member, thereby completing the process either of giving life to the individual, or of propagating the race. Thus, the lung prepares the air. The liver carries out the first digestion so far as to prepare for the third and fourth digestion. The more perfectly the liver functions in regard to the second digestion, the more likely is the blood so made to be adequate for nourishing the tissues. Hence in this respect the liver effects an action; and, in so far as the liver assists in accomplishing a further action, so it is preparative for that action.

125. *Classification of the members according to their origin.*—

Some members take their origin *from the semen*: namely, members composed of like parts, except the flesh and the fat. Other members come *from the blood*: namely the flesh, and the fat. Other members come *from both male and female "sperm."*\* According to the teaching of philosophy, the process of generation may be compared with the processes which take place in the manufacture of cheese. Thus the male "sperm" is equivalent to the clotting agent of milk, and the female "sperm" is equivalent to the coagulum of milk. The starting point of the clotting is in the rennet; so the starting-point of the clot "man" is in the male semen ("We made the life-germ a clot"—Q.23.14). Just as the beginning of the clotting is in the milk, so the beginning of the clotting of the form of man lies in the female "sperm." Then, just as each of the two—the rennet and the milk—enter into the "substance" of the cheese which results, so each of the two—male and female sperm—enters into the "substance" of the "embryo."

\* The word "Sperma" is here really more exact than "semen." Semen =  $\pi$  + sperm. Therefore it is not incorrect to speak of a "female sperm." Note that only a portion of the spermatozoon enters into the new human being, and not all the ovum.

Paracelsus wrote that the "sperm" is not the visible seminal fluid of man, but rather a semi-material principle contained therein, or an "aura seminalis," to which the semen serves as a vehicle (De generatio hominis: Hartmann, 2<sup>d</sup>, p. 72). In another place he says "the matrix attracts the seed of both persons, mixed with the semen, and afterwards expels the semen, but retains the sperm. Thus the seed comes into the matrix. The matrix does not merely mean the womb of a woman; the whole body of the woman is a mother, a matrix."—(De morbo. matric).

Galen gives a contrary account. He considers that each of the sperms has both a coagulative power and a receptive capacity for coagulation ; so he says that the coagulative power is stronger in the male than it is in the female, but the receptive capacity for coagulation is stronger in the female than the male.

But the real truth of the matter is expounded in our own works dealing with the fundamental principles of natural science.

**126.** *Relations between the female menstrual blood and the embryo.*

1. During pregnancy, the blood which is otherwise discharged from the female at the time of menstruation becomes nutriment (for the embryo) in three ways. One portion is changed into the likeness of the substance of the sperm and the members derived therefrom. This is the nutriment which enables growth to take place. Another portion is not nutriment of that kind, but is capable of being aggregated into the material which fills up the interstices in the principal members and becomes flesh and fat.

A third portion is effete material, and not utilizable for either of the two preceding purposes. It remains in the same situation until the time of birth, and is then expelled with the infant.

After birth, the blood which the liver of the infant makes takes the place of the maternal blood. So it arises from an organ which itself was formed out of the maternal blood.

**127.** The flesh of the infant is derived from the gross blood, congealed by heat and dryness [cf. the fact that a moderate degree of heat coagulates egg-white]. The fat of the infant is derived from the aquosity and unctuousity of the blood, which cold has congealed and heat dispersed.

**128.** *Repair of damaged members.—(a) Members derived from the sperm.*

Should a loss of continuity arise in the members derived from the sperm, restoration can only occur, and then only in a few of them, and if the individual is spare in habit, and has not passed the age of juvenility. These members are : the bones, the small branches of veins ; medium-sized veins and arteries. For when disseverance occurs in such members as bone and nerves, they will not grow again.

(b) *Members derived from the blood.*

If the members which are derived from the blood are damaged, they are renewed out of like substance. E.g. the flesh.

(c) *Members derived from both blood and sperm.*

If the member which is damaged arises both from blood and sperm, then, as it is not very long since the sperm was there, it will be reconstructed (Ex.; the teeth at the age of juvenility) unless meanwhile the blood has undergone a change of temperament. In that case re-construction would not take place.

129. Sensation and movement is sometimes conveyed to a member through one single nerve, sometimes through several nerves. In each case the nerve is the source of the power.

130. *The membranes which cover the internal organs.*—These all arise either from the pleura or the peritoneum. Those members in the thorax, which derive their covering from the pleura, are : the diaphragm, the veins and arteries ; the lung. These organs in the abdomen are covered from the peritoneum which covers the muscles of the abdominal wall.

131. *Texture of members.* All members are either fleshy in texture or fibrous (like the flesh found throughout muscles), or are devoid of fibrous texture (e.g. liver). Fibrous texture goes with power of movement—voluntary in the case of voluntary muscles ; involuntary in the case of the uterus and veins. Compound movements, like that of deglutition, depend on the direction of the fibres being various—longitudinal, oblique, transverse. The longitudinal fibres produce in-drawing ; the oblique fibres expel or force onwards ; the transverse fibres grip and hold.

Even where a member has only one coat, as is true in the veins and bladder, there are still three kinds of fibres which interweave one with another. Members which have two coats have the cross fibres externally, and the others on the inner side. The longitudinal fibres tend towards the inner surface. The purpose of this arrangement is that in-drawing and expulsion should not occur simultaneously, whereas there is no objection to the acts of in-drawing and holding and gripping occurring together—except in the case of the intestines, where much retention is disadvantageous, whereas in-drawing and expulsion are all-important.

132. *Hollow* (tubular) members which contain substances different from their walls have sometimes one coat, sometimes two. The presence of two coats serves the following purposes :

(1) to provide the necessary strength to the walls, so that there is no risk of the proper power of movement failing at any time. Ex.: arteries.

(2) to ensure that the contents shall not dissipate or escape. One coat would not suffice to retain so tenuous a substance as the breath which the arteries contain ; and it would make the risk of rupture or severance in injuries too great, in which case death would be very liable to occur because the blood would then drain out.\* This is a very great danger.

(3) where there is a demand for vigorous suction and expulsion, it is beneficial to have a separate instrument available for the performance of both actions rather than to distribute both powers over the one coat. This applies in the case of the stomach and intestines.

(4) where each coat of a member subserves its own action ; or each action requires its own particular temperament. Thus, in the case of the stomach, there is a need of a power of sensation (which can only exist in a tissue containing nerves) and also a power to execute the movements of digestion (for which a fleshy tissue is needed). Hence each need is supplied by its own coat—the nerve-containing tissue for the power of sensation ; the fleshy coat for the power of executing the movements entailed in the work of digestion. Nature made the inner coat capable of sensation, and the outer coat fleshy. The operation of sensation requires actual contact with the nervous tissue, as is true in the case of the sense of touch ; but the movements necessary to enable digestion do not require contact of the material to be digested with the fleshy walls.

**133.** Certain members (e. g. the flesh) have a temperament so near to that of blood that the latter needs to undergo little change in order to subserve nutrition. Consequently there is no need for apertures or for spaces or cavities in these members, wherein to retain nutrient material pending its transformation into their own substance. In such members the nutrient at once becomes identical with their substance.

**134.** But other members (e.g. the bones) have a temperament which is very different from that of the blood. Therefore before these can be nourished, the blood must needs undergo a series of successive transformations before becoming like to them in substance. That is why spaces were made in which nutriment can be retained long enough to enable the conversion to take place. This is true in the case of the femur and humerus. In the case of the lower jaw bone numerous apertures are seen scattered through it. In this way more nutriment can be accommodated

\* Note this proof that Avicenna knew the arteries contain blood.

than is necessary for the moment, and the transformation into their own likeness can take place little by little.

135. Lastly, strong members expel their waste matters into the adjacent weaker members. Thus the heart to the axilla ; the brain to the tissues behind the ears ; the liver to the groins.

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§ 118. The next four subsections of the text are omitted. They deal with the anatomy of the bones, muscles, nerves and blood-vessels, and are naturally inadequate in comparison with modern Anatomy.

Ancient anatomy has been criticized for allowing as a basis the dissections of monkeys and other animals, apparently overlooking the important factor of circumstance, in order to give the impression of lack of acumen in those days. But in our days, ability and acumen being taken for granted, it is considered allowable to base conclusions in the domain of physiology and pathology upon laboratory reactions obtained from the same kinds of animals. Some workers are alive to the possible insufficiency of data so obtained, but make a virtue of necessity. This may also be claimed for Avicenna.

Avicenna was seeking to express a certain truth in these subsections as well as in other parts of the Canon, and it is profitable to abstract it and develop it further in the light of modern knowledge. The following are some of the considerations in mind.

§ 119. *The variations of anatomical structure* which are observed throughout the animal kingdom are the expression of the differing nature and requirements of the respective animal-types. But in dealing with comparative anatomy it is usual to regard evolution as the essential factor, and a false meaning to the phenomena is thereby instilled. We speak of animals as "higher" and "lower" for convenience, but strictly all are equal, because "each creature has such perfection as it was possible for it to have." (St. Thomas,<sup>82</sup> p. 108), and its place is in accordance with the "end" for which it was brought into being, the word "end" bearing the scholastic sense. The proper use of the theory of evolution in comparative anatomy, like that of Ehrlich's theory in regard to immunity, is that it enables many discrete facts to be memorized. To raise either to the dignity of "truth" necessitates an overlooking of the fundamental properties of the nature of being.

§ 120. *Deformities.* These may be explained on an evolutionary basis, using the ideas of "reversion," "atavism," etc. When the individual is studied in regard to his "end" (in the scholastic sense) a different conception comes to light. But as this brings in the question of events belonging to the category of morals ("to the third and fourth generation"), the problem is at once evaded. Such a conception would not be vitiated by the existence of deformities among animals.

§ 121. *The intimate structure of the body is always changing* although the anatomical structures appear to remain unchanged.

Hence it is possible to see in these structures merely a locus for the various faculties and functions pertaining to the physical, mental and emotional life of the individual. Compared with his existence in the scheme of things, the anatomical details are mere "moments musicales."

To take a special example, one might regard the blood-forming centres as the (momentary) point of meeting of two vitalities. (Cf. §147.)

§ 122. *Relation between structure and function.* This formed the subject of a classic in medical literature—that in which Galen regards anatomy as the expression of the *φύσις*. Such a teleological view is not in favour to-day, and, indeed mistakes (as Galen did) the root principle emphasized in these pages. To use the symbolism given in § 56, 64, *M* is not the "expression" of *F*. In associating structure with function this must always be remembered. The examples available for Avicenna, striking as they seemed to him, are surpassed by those possible through modern knowledge. Thus, harmonious succession of events, both in time and place, is to be discerned throughout the body. The output of the various digestive juices, separately achieved, yet co-ordinated as to time is also co-ordinated as to place. The output of bile, for instance, is fitful—sometimes a delicate trickle, sometimes in spurts, sometimes in larger quantities; and this in co-ordination with the activity of the muscular bundles beneath the membranes which secrete the digestive fluids—in which both nervous and vascular variations play an intimate part.

Out of many other instances, the following may be given. The adrenal vein joins the inferior vena cava at a given point, in order to secure that the adrenal secretion shall enter the blood in time to receive the activating substances supplied for it by the liver *before* it becomes exposed to the oxygen contributed by the respiration; for otherwise the activation would be nullified. (Cf. Sajous<sup>149</sup>.)

§ 123. *Transcendence of organs, fluids, and the like, beyond anatomical boundaries.*—This has already been referred to in the opening chapter. Thus (*a*) "heart" includes the arterial system and something more; "liver" includes the venous system and something more; "brain" similarly goes beyond the organ within the cranium to the cutaneous nerve-endings. This is why a "function test" for a given organ is never satisfactory. (*b*) Vascular channels and tissue spaces are simply demarcations of fluids from adjoining tissues. The river exists because there is water to flow, and incidentally is an "anatomical feature" of the country, serving various purposes. Its presence is the indication of, and continues only as long as, certain incessant changes occur in Nature at large. To use other words, the vascular channels are the materialization of the stream of blood; or, the current of "life" *made* the blood-vessels become demarcated. (*c*) The humours of the body circulate also in the subtle fashion suggested thus: the sanguineous humour is not only in the blood vessels but also in lymph channels: the serous humour moves in the connective-tissue spaces as well as in anatomical lymphatics, and appears also in the form of the "eau de constitution"

(Vallery-Radot<sup>141</sup>) of the tissues: the bilious humour may be followed in the track of cholesterin (and other constituents.) The constant loss of hair, nails, teeth, should also be recognized as being part of the constant separation of "superfluities." (Cf. Paracelsus<sup>29</sup>). (d) If we realize that tissue-spaces and cavernous tissues are forms of channels, it will be clear that the whole body is really an aggregate of "tubes" of some sort. It may then be said further, that disease always starts from tubes,—namely when their lumina are blocked or when their "walls" become semipermeable or quite impervious.

§ 124. Anatomical structures depend for their existence on chemical structure. Water, for instance, may be said to come into visibility in the form of an anatomical structure. Conversely, other substances are only visible as long as they are not yet an integral part of the living substance of the body, and others are visible because they have ceased to be such.

As soon as microscopic visibility is attained, the visible thing has ceased to be "living." Stability of form entails the stagnation of certain substances, and also implies that they have been rejected from the cycle of life in order to provide the substrate or platform or *points d'appui* for the actual living substance (i.e., the life-principle) to manifest its faculties during a certain (often limited) period of time. Cf. § 121.

§ 125. *Histology* (i.e. microscopic anatomy) *and function*. From the preceding consideration, when a tissue is observed through the microscope, the thought should be "that is the spot where this or that substance has emerged into visibility at this moment." This conception is specially applicable to the case of the blood-cells. Cf. § 95-99.

§ 126. *Anatomy as the expression of strengths and weaknesses*. It is clear that the relative development of different parts of the body, from head to foot, reveals its physical strengths and weaknesses. Where one part is strong, another is compensatorily weak. But it is less obvious, and less realized, that anatomical conformations are also revelations of strengths and weaknesses of mental make-up. Here also, the strength of one feature goes with deficiency of some other. The root principle of *jelal* and *jemal* already referred to (§ 82) holds good throughout, and in a multitude of directions. Mental capacities and activities affect the vegetative processes just as do the emotions, for their influence lasts throughout life. As S. Thomas says: (a) "every operation of the sensitive soul belongs to the composite" (S.T., 75, 3, <sup>84</sup> p. 10). (b) "There are certain operations common to the soul and the body, such as fear, anger, sensation, and so forth; for these happen by reason of a certain transmutation in a determinate part of the body, which proves that they are operations of the soul and body together" (C.G., ii. 57, <sup>82</sup> p. 139). (c) "We find in the intellective appetite, which is the will, operations specifically similar to those of the sensitive appetite, differing in this, that in the sensitive appetite they are passions, on account of its connection with a bodily organ, whereas in the intellective appetite they are pure operations. For just as by the passion of fear which, in the sensitive

appetite, one shuns a future evil, so without passion, the intellective appetite has a like operation " (*ib.*, <sup>82</sup>90, p. 190).

§ 127. From all this it is clear that much is to be learned from external anatomy (head, face, hands, joints, skin markings, etc.) as to the strength and weakness, not only of the body as a whole, but of the several organs in particular. Were the study of internal anatomy combined with the external, the associations would be more appreciated. The "case" is not really finished when a "handful" of viscera has been studied in the autopsy-room or even in the laboratories attached thereto. The remaining "shell" passes on into oblivion bearing its wonderful secrets with it, for its language is such that however loudly it "speak," there are few with ears to hear, and perhaps none with ability to interpret.



## THESIS VI

### THE FACULTIES OF THE BODY

" LIFE appears through various operations in different degrees of living things " (S. Thomas, S. Th. q. 76, art. 1).

#### I. GENERAL DISCOURSE ABOUT THE SEVERAL KINDS OF FACULTY

**F**ACULTIES (136) are to be distinguished from functions. The difference is that the former originate the latter. But as each function depends on its own special faculty they can be treated together.

Faculty : the name of a property whereby the phenomenon of life is manifested. Function : actualized potentiality.

Faculty = power = potentiality. Faculty is *not* force ; it is potential power ; it is static. Power is the faculty in a state of activity ; it is dynamic.

The *tout ensemble* of faculties is " the soul."

The *tout ensemble* of functions is " life." See § 150.

Weakness of faculty corresponds to " hypofunction." Plethora of faculty corresponds to " hyperfunction".

**137.** There are three kinds of faculty, and therefore of functions proceeding therefrom. Namely, the vital (*haywaniat*) ; the natural (*taby 'yat*) and the animal (*nafsaniat*).

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§ 128. These three terms, derived from the Latin version, only properly express the meaning of the Arabic if they are taken in their original sense. The third term is rendered " psychical " by some translators,<sup>163</sup> but is open to objection because its modern usage does not sufficiently correspond to the idea of *nafsaniat*.

Other words are preferred in the course of the present translation. The familiar " vitality " is convenient for the first term. The words " vegetative " and " sensitive," employed in the Dominican translation of the Summa,<sup>84</sup> are satisfactory renderings for the other two terms, and are to be understood strictly in the Thomistic sense. The term " natural " is reverted to in 551 for reasons there given.

The variations in scope exhibited by these and allied terms are conveniently indicated in the following table.

§ 129. ANALYSIS OF CERTAIN TERMS APPLIED TO LIVING THINGS :—i.e., BEINGS  
ENDOWED WITH "LIFE."

		A. Vegetable.	B. Animal.	C. Human.
I. <i>Distinctive quality.</i> <sup>1</sup>				
1. In Modern language.		Vegetative. Organic.  Organo-vegetative (Martinet)	Sentient. (Lower) mental powers.	Rational; intellectual, Higher mental life, Psychic powers.
2. Platonic term.		Nutritive.	Appetitive.	Rational.
3. In Avicenna. <sup>2</sup>	Vital. <sup>3</sup>	Natural. <sup>4</sup>	Animal. <sup>5</sup>	Ratiocinative faculty.
4. Scholastic terms.		Vegetative (life or soul).	Sensitive (life or soul). Sensuous (Necessarily implies "appetition," <sup>6</sup> 78, i. p. 78)	Rational (life or soul).
II. <i>These terms are based on—</i>				
(a) the faculties pertaining to each				
(i) Pre-modern thought.		Plants have only nutrition, growth, and reproduction.	Animals have also sensation and movement.	Human beings have also intellect or intelligence.
(ii) Modern thought.		But modern research (cinematograph, etc.) shows sensory and motor powers.	But some animals exhibit intellectual powers often supposed to be purely human. <sup>7</sup>	But this is not so for some races of men, and in some cases of disease of the brain.
(iii) In terms of Consciousness.		Unconscious life.	Subconscious life and lower conscious life.	Fully conscious life
(b) On essential manifestations (3. Avicenna).	As "breath" <sup>8</sup>	As "nature."	As sensation, movement, and cogitative power. <sup>7</sup>	As capacity for abstract concepts.
(c) On fundamental causes. (4. Scholastic basis.)		Effected by means of a corporeal organ, in virtue of a corporeal quality.	Effected by means of a corporeal organ, but not in virtue of a quality.	Is effected apart from a corporeal organ or quality.
(d) on theological considerations.		Mortal.	Deals with particulars. Mortal.	Deals with universals <sup>8</sup> (78, i. p. 78). Immortal: (a) absolutely (Scholastic view); (b) conditionally (some creeds).
III. <i>Chief organ concerned.</i>				
1. In modern thought.		All vegetative organs equally important (Biochemical processes in general).	Nervous system (automatic and central).	Brain (Grey matter of cortex.)
2. Platonic.		Liver.	Heart. <sup>9</sup>	Brain.
3. Avicenna.	Heart. <sup>8</sup>	Liver (and Gonads)	Brain.	
4. Scholastic.		All viscera. No special organ because "life" belongs to all.	Nervous system, but also the whole "being."	No material organ.

## Notes on points arising out of this table :

<sup>1</sup> *Boundaries of the Three Kingdoms* :—These are admirably set out in Chahar Maqala<sup>7</sup> : “When the vegetable kingdom was produced, God gave it the four forces and the three faculties. When the animal kingdom was produced, God added two more faculties—that of perception (with five external senses and five internal senses), and of movement. When the human kingdom was produced, God added a capacity for abstract concepts (intelligence).”

<sup>2</sup> Avicenna's division : this is determined by medical requirements.

<sup>3</sup> *Vital faculty*.—This is not specifically mentioned by S. Thomas, because implied in the word “life.” He refers to it thus : “The vital operation . . . whereby something is shown to be living”<sup>84</sup> (liv. 2. p. 44). “Life-principle” has a wider scope than implied in “vital faculty” :—“The vital principle is the ‘form’ or determining principle of the living being. Coalescing with the material factor it constitutes the living being. It unifies the material elements into one individual. It holds them together . . . as a mass of chemical compounds, many of them most complex and in very unstable equilibrium, constantly undergoing change and tending to dissolution into simpler and more stable compounds. When life ceases, the process of disintegration sets in with great rapidity. The function, then, of this active informing principle is that of a unifying, conserving, restraining character, holding back, as it were, and sustaining the potential energies of the organism in their unstable condition.”—(Maher<sup>11</sup>, p. 427).

<sup>4</sup> *Natural faculty*.—i.e., “pertaining to the ‘nature.’” That is, (a) the mere fact of living at all, (b) powers in common with laws of Nature in general. Compare the term “natural science,” “natural philosophy” (used before the present era) applied to the modern chemistry, physics and their subdivisions. The ancients recognised that physiological phenomena in regard to the “natural” life were kin to those of our chemistry and physics.

Note also the meaning of “nature” in : “the natural appetite is that inclination which each thing has, of its own nature, for something. Wherefore by its natural appetite each power desires something suitable to itself.”<sup>84</sup> (p. 78).

<sup>5</sup> *Animal faculty*.—The word “animal” really denotes simply “a thing with an anima” ; hence man is an animal. But different people among all nations use the word (in their own language) entirely vaguely, and thus give rise to perennial confusion of thought when applying it in daily life. The following meanings are assigned to it :

(i) Generally or collectively, it refers to the presence of life : e.g., anima-te ; in-anima-te.

(ii) Specifically or particularly. (a) indefinitely as (a ‘) “soul” (a ‘’) “mind” (a ‘ ‘ ‘) “spirit” (quaecumque substantia invisibilis”<sup>82</sup>—i. 41, 3, 4). (b) More definitely =  $\phi\upsilon\chi\eta$  = lower soul, as opposed to animus, the higher soul, whose seat is the “heart,” the centre of cognitive and emotional life.” (xiv. 153). See § 150, 151.

<sup>6</sup> Manifestation as “breath” ; or, by means of the breath. See § 161. Breath = spiritus, which is defined by S. Thomas as “an instrument of the soul, *tenue, lucidum, calidum, ex puriore sanguine*” (i. 41. 3. 4). cf. preceding note, under “spirit.”

<sup>7</sup> S. Thomas recognized such powers in animals : “Cognitive and memorative powers are not distinct, but the same, yet *more perfect* (in man, that is) than in other animals.”<sup>84</sup> (78. i. p. 90).

<sup>8</sup> *The heart*.—In the platonic view it is the chief organ of the appetitive soul ; in Avicenna it is that of the breath. See §§ 136-141. But this would make the appetitive soul equivalent to the vital faculty, which it is not. Another objection to the platonic view is explained by S. Thomas<sup>82</sup> (p. 145).

§ 130. “Only three powers or parts of the soul are commonly assigned—namely, the vegetable soul, the sensitive soul, and the rational soul. . . . There are five genera of powers of the soul—the vegetative, the sensitive, the appetitive, the locomotive, and the intellectual. Of these, three are called souls, and four are called modes of living.” . . . The reason of this diversity lies in the various souls being distinguished accordingly as the operation of the soul transcends the operation of the corporeal nature in various ways ; for

the whole corporeal nature is subject to the soul, and is related to it as its matter and instrument. There exists, therefore, an operation of the soul which so far exceeds the corporeal nature that it is not even performed by any corporeal organ; and such is the operation of the rational soul. Below this, there is another operation of the soul, which is indeed performed through a corporeal organ, but not through a corporeal quality, and this is the operation of the sensitive soul; for though hot and cold, wet and dry, and other such corporeal qualities are required for the work of the senses, yet they are not required in such a way that the operation of the senses takes place by virtue of such qualities: *but only for the proper disposition of the organ*. The lowest of the operations of the soul is that which is performed by a corporeal organ, and by virtue of a corporeal quality. Yet this transcends the operation of the corporeal nature; because the movements of bodies are caused by an extrinsic principle, while these operations are from an intrinsic principle; for this is common to all operations of the soul, since every animate thing, in some way, moves itself. Such is the operation of the vegetative soul; for digestion and what follows is caused instrumentally by the action of heat, as the Philosopher says."—Sum Theol.<sup>83</sup> Q. 78, art. 1: Trans.,<sup>84</sup> p. 75, 76.

**138.** Many philosophers, and all physicians who follow Galen, consider that each faculty has its own principal member, which forms its storehouse, and from which its functions emerge. On this view the rational faculty resides in the brain, and its functions proceed from the brain. (Cf. § 130).

**139.** The *natural or vegetative faculty* is twofold, and includes (i) the *nutritive* faculty, which is concerned with the welfare and preservation of the individual, and secures nourishment to it to the end of life. This faculty resides in the liver, and its functions emerge therefrom. (ii) the *reproductive* faculty, which ensures the propagation of the race. This subserves the process of generation, and separates the substance of the sperm from the humours of the body and fashions the new body according to the decree of Allah. The seat of this faculty is the generative organs, and its functions proceed from them.

**140.** The *vital faculty* preserves the integrity of the breath, and is the vehicle of sensation and movement, and makes the breath able to receive these impressions (of sensation and movement), and, having reached the brain makes it capable of imparting life, and then spreads in every direction. The seat of this faculty is the heart, and its function proceeds from this. (See 162-167).

**141.** Now the great philosopher Aristotle believes that the heart is the source of all these functions, though they are

manifested in the several principal organs. But physicians still keep to the opinion that the brain is the chief seat of sentient life, and that each sense has its own distinct member whereby it manifests function. But if physicians thought over the whole matter as thoroughly as they should, they would take Aristotle's view instead. They would find that they have been only regarding appearances instead of realities, taking non-essentials for essentials. (Cf. 119, 165). The establishment of this truth is for the philosopher and natural scientist, and not for the doctor as doctor. But the latter, looking on members as being initiators of the faculties instead of as their manifestation—thus despising or ignoring philosophy—fails to see which things are prior, and accordingly overlooks the proper basis for the treatment of diseases, and for the remedying of bodily defects (*p*).

“There is in the body no one beginning, but all parts are alike beginning and end; for a circle has no beginning.” (Hippocrates).

## 2. THE NATURAL FACULTIES

142. The *natural faculties* are divisible into two groups :  
(a) *dominant* or directing, (b) *subservient* or obedient.

The *dominant faculties* are twofold : (i) concerned with the preservation of the life of the individual ;—the nutritive faculty and the augmentative faculty (power of growth), (ii) concerned with the preservation of the race :—the generative faculty ; and the formative or plastic faculty.

§ 131. *Classification of the Natural Faculties.*

General purpose.	Dominant faculty (ḥadima)	Subservient faculty <u>Khadama</u> .	Synonyms.	Qualities.	Element	Corresponding Mental process.
The Individual	Nutritive (ghāzīa) (143) " The four handmaids of nutrition."	i. Attractive Jādhiba (147)	Apposition. Presentation Prosthesis.	Hot and dry.	Fire.	Perception.
		ii. Retentive Māsika (148)	Agglutinative Adhesion. Prosphysis.	Cold and dry.	Earth	Memory.
		iii. Alterative Hādima (149)	Transformative. Assimilative-poietic (e.g. haemo-poietic).	Hot and moist.	Air.	Cogitation
		iv. Expulsive Dāfi'a (150)	Propulsive Expeditive.	Cold and moist.	Water	Expression.
	Augmentative (nāmīa) (143)		Auxetic. Plastic. Incremental.			Acquisition of knowledge.
The Race.	Generative (muwallida) (145) (1) in the strict sense (2) primary transformative faculty (mughayyara)		The masculine factor. (Tr.)		Aether	Creative and Inventive faculties.
	Informative (maṣawwira) (145)		Plastic. Operates in utero. The feminine factor (Tr.)			Constructive faculties.

**143.** *The faculties pertaining to the preservation of the life of the individual.*

The nutritive faculty is that whereby the aliments are transformed into the likeness of the thing nourished, thereby replacing the loss incidental to the process of life.

The augmentative faculty is that whereby the increase in size of the body in all directions in just proportion is secured. This is brought about by means of the substances derived from the aliments. The nutritive faculty is subservient to this augmentative faculty in so far as it enables the preparation of the requisite substances from the aliments, but growth will not occur unless more is supplied than is lost. However the supply of more substances than are lost does not necessarily produce growth. Growth implies an increase in all directions in the proper proportions. To become fat or obese with advancing years, after being slim, is not growth. It is not growth unless the increase is in all dimensions and in natural proportions, so as to culminate in a state of perfection of growth. Adiposity, for instance, is not a perfection of growth before adult age, any more than it is a perfection for the figure to be very slim after maturity to a greater degree than natural.

**144.** There are three special functions in the process of nutrition. (i) the *apposition* of the altered material, namely, the blood, or a humour which is potentially like the tissue to be nourished. If this process is defective, as may happen in disease, there is "atrophy," which is a defect of nutrition. (ii) *agglutination*—a later stage. Here the nutriment apposed to the tissue is now fully united up to it, and made a part of it. This may be lacking owing to disease, and then occurs what is called "fleshy dropsy." (iii) *true assimilation*—a stage still further where that which has been made into a part of a member becomes absolutely like it in all respects, in essence and colour. This fails in such conditions as leprosy and vitiligo, in which cases the first two functions are achieved, but not the third.

These three procedures are the work of the transformative power. This is really a single faculty, though distributed among the respective members. For in every member this faculty is corresponding to its temperament, and so transforms the aliment into the likeness (*ad-similis*) of that member; in each case it differs from that which transforms aliment into the likeness of the various other members (or tissues). So (we may say) the transformative faculty of the liver ramifies throughout the whole body.

**145.** *The faculties pertaining to the preservation of the race.*—The generative faculty is two-fold. (i) That which gives rise to the male and female “sperm,” the reproductive units, (ii) the formative power (i.e., in the male element) which separates from one another the various faculties in the sperm and rearranges them in such a way that each member (and tissue) receives the temperament appropriate to it—thus, to nerve, its distinctive temperament; to bone, its distinctive temperament. The one “sperm,” apparently homogeneous, opens out in all these directions. This is called the *primary* transformative faculty.

The *informative* or *plastic faculty* (lit. as in making a sculpture painting) is that (in the female element, Tr.) whereby, subject or to the decree of Allah, the delineation and configuration of the members is produced, with all their cavities, foramina, positions and relations to one another, their smoothness or roughness, and so on—all being controlled up to the final limits of their natural growth (dimensions). Subservient to this faculty, in regard to that part of the nutriment which serves for the preservation of the species, are the nutritive faculty and the power of growth.

§ 132. From the annotations by Costaeus: reproduction implies a plastic faculty; and that implies transformative power, and that depends on the four qualities. Growth cannot occur without nutrition; nutrition cannot occur without agglutination or assimilation; agglutination cannot occur without apposition; assimilation cannot occur without transformation; transformation cannot occur without retention; and retention cannot occur without affinity. Each successive step entails the removal and excretion of the products and by-products of the preceding steps, for these are hindrances to reproduction, nutrition and growth.

### 3. THE FACULTIES SUBSERVIENT TO THE NATURAL FACULTIES (VEGETATIVE LIFE)

**146.** VEGETATIVE LIFE (i.e. the natural faculties) is subserved by four faculties: attractive,\* retentive, transformative,† expulsive.

**147.** The *attractive faculty* was created so that the body could draw to itself whatever nutriment is required for its preservation. The longitudinal fibres in an organ form the instrument used for the purpose. The liver attracts the chyle from the stomach by sucking, as it were, the purer parts thereof by way of the mesenteric veins.

**148.** The *retentive faculty* was made so that the material so drawn in could be held (in position) during the time that the

\* The word attractive, in the original, is primarily with the thought of the attraction of (female) beauty and has a peculiarly appropriate application in consequence.

† “Ferment” actions of the body belong here.

alterative (transformative) faculty is engaged in preparing sound nutritive substances from it. The instrument employed for this are the oblique, and in part, the transverse fibres. (In the case of the liver, the chyle is retained in it long enough to enable the sanguificatory power to act upon it.)

**149.** The *alterative* or *transformative* faculty is that which alters the material attracted and held by these two powers. It transmutes the material from its former state until it has become worked up into a temperament such as enables it to become efficient nutrient material. This process is "digestion" in the strict sense.

At the same time it produces a change in the superfluities so that they can be easily discharged from the member containing them. This process is called "*maturation*." By its means three things happen : (1)—the texture of the superfluities becomes attenuated, when it is inspissation that hinders expulsion ; (2)—the texture of the superfluities becomes thickened, when it is attenuation that prevents their discharge ; (3)—the superfluities are entirely broken up, if it be viscosity that hinders expulsion. It is a mistake to use the terms "digestion" and "maturation" as synonymous.

**150.** The *expulsive faculty* is that whereby the superfluities from digestion are expelled. Superfluities are such as are unsuitable as nutriment, or are in excess of requirements (and therefore "superfluous"). By means of this faculty, the waste matter is expelled into the bladder as urine, and other excreta through their several appropriate organs and apertures. Where there are no orifices, the wastes are transferred by this faculty from noble to less noble organs ; from hard structures to soft ones. And if there is a diversion of waste matter from the proper route, the expulsive faculty cannot remove as much as otherwise.

**151.** *Inter-relations between the faculties and the qualities.*—

These four natural faculties are subserved by the four primary qualities—heat, cold, dryness, moisture. Strictly speaking, heat is the underlying factor in all the subservient faculties.

**152.** *Action of cold.*—While cold aids all four faculties it does so indirectly and not directly—except in so far as it is the contrary of all the faculties. For all the faculties act in virtue of movement, which is shown not only as attraction and expulsion, but even in the transformative process (digestion proper) ; for the latter consists in the separation of gross and aggregated particles from one another,

and in the condensation together of the finer and separated particles. The movements of dispersion and aggregation are simultaneous. Movement is also concerned indirectly in the retentive faculty, because the transverse muscular fibres come into play. Coldness enfeebles, stupefies, and mortifies, and hinders this faculty in all its functions ; yet, indirectly, it helps it by fixing the fibres in the position referred to. Therefore it is not directly concerned with the faculties ; it simply causes their instruments to be in a state which will help their functions to be maintained.

Coldness aids the expulsive faculty (1) by preventing the dispersal of the gases which favour peristalsis, (2) by keeping the particles of the aliment coarse, (3) by its astringent action upon the transverse muscular fibres. In these ways coldness renders the instruments of the faculty in an appropriate state. Evidently, then, it only helps the faculty indirectly. Did it act directly, it would obstruct and weaken the movements.

**153.** *Action of dryness.*—Dryness is directly instrumental in the functions of two faculties—namely the alterative and retentive. It is auxiliary in the case of the other two—the attractive and expulsive. This is because dryness delays the movement of the breath, enabling it to take on with it those faculties which it has encountered with a vehement impact. It also prevents the moisture present in the substance of the breath or its instrument from flowing away. Dryness helps the retentive faculty because it favours (muscular) contraction (i.e. upon the contents of the organ). The transformative faculty needs moisture (and not dryness).

**154.** *Comparative relations between the qualities and the faculties.*—If one compares the degree of active and passive quality requisite for the various faculties, one finds that the retentive faculty needs more dryness than heat. This is because more time is required for a movement to come to rest than is needed to start a contractile movement of the transverse fibres.

**155.** Heat is necessary for movement, and it takes only a short time to produce its effect, so that the remainder of the time is occupied in holding the material and coming to a state of rest. This explains why the temperament of juveniles tends to moistness, for their digestive power is weaker.

**156.** The attractive faculty needs more heat than dryness because the chief feature of attraction is movement, and movement demands heat. The organs concerned must move rather than be at rest and contracted (for which dryness is needed).

Not that much movement is required for this faculty, though at times violent activity becomes necessary. Attraction is brought about (*a*) by an attractive faculty—as when a magnet attracts iron, (*b*) by heat, as when oil is drawn up in a lamp.—Some physicists assert that the last-named is really an example of filling up of a vacuum.

Heat increases the power of the attraction exerted by the attractive faculty.

**157.** The expulsive faculty requires less dryness than the attractive and retentive faculties, because there is not the need of the muscular contraction requisite for retention, nor for the apposition necessary for attraction ; nor a need to maintain contraction upon an object until the next stage of the process is reached. Nor is there a need for repose ; but, on the contrary, there is a need of movement, and also a small amount of inspissation—just enough to ensure that degree of compression and expulsion which is necessary to make the contracted viscus an instrument. Lastly, whereas the retentive faculty requires a long period of time and the attractive power only a short period—namely that necessary to bring one thing in contact with another—so there is less need of dryness.

**158.** The transformative faculty requires more heat than the other three. It does not need dryness but moisture, for by moisture the nutrients are rendered fluid and so become able to enter the pores and become moulded into the conformation of the channels to be traversed. But one must not suppose that because moisture aids digestion, juveniles (whose temperament is moist) can digest hard or indigestible foods. This can be done in youth, but here the reason is not to be found in their moisture ; it is because at that period of life the “nature” is similar to that of the foods in question. Foods of hard nature are not appropriate for the juvenile temperament (which is soft), and therefore their transformative faculty cannot cope with such food ; their retentive faculty cannot hold it, and their expulsive faculty rapidly expels it. In the case of youth, on the other hand, such hard food is quite suitable for nourishment.

159. The following brief table gathers together these points :

	Duration of muscular contraction.	Amount of longitudinal movement achieved.
Attractive Faculty.	Quite short	Marked.
Retentive Faculty.	Long ; continued.	Moderate.
Alterative Faculty.	Continued.	None.
Expulsive Faculty.	Momentary.	Considerable, but superadded from without.

The alterative faculty needs liquefaction and commingling of substances.

160. So the various faculties make use of these four qualities in diverse ways and to different extents.

§ 133. Thus, the attractive faculty is not equal in degree in all organs. Heat is stronger in the liver than in the stomach and intestines, in arteries than in veins. The liver at one time is hotter (and therefore the attractive faculty is greater) than at another. So also in the case of the stomach. Hence, if the stomach is empty and the liver is hot, the stomach will draw out the serous humour and bile from the liver. Just as a strong person can take something out of the hands of a weak person if he wants to, or, on another day, the weak person is the stronger\* (Cf. Galen, Daremberg, <sup>12</sup> ii. p. 307).

"The operation of the vegetative principle is performed by means of heat, the property of which is to consume humidity."—(Sum. Theol. <sup>14</sup> 75, p. 81.)

#### 4. THE VITAL FACULTY.

161. The power which the members receive before they can acquire the capacity for the faculties of sensation and movement, and for accomplishing the various functions of life, is called the "vital faculty." Closely related to this (subject) is (that of) the "breath," and therefore also of the emotions of fear and anger, because they coincide with the expansion and contraction of the breath. (p.)

§ 134. Vital faculty = *virtus vitalis* = vitality = innate heat = "spirits" (corporeal, vital, natural, animal) = breath (which is its manifestation) = Spirit = "refined form of bodily substance or

\* There is a striking parallel to this passage in the "I t'ung chêng mo" (circa A.D. 1056), on page 25 of the subdivision "Mo Chueh Chih Chang": referring to the changing dominance of the types of "breath" in the various organs, perceptible by a study of the pulse. The author states: "it is just like the case of the king of Wu, who obtained the supremacy over the dominion of Chu, and then neglected his own defences. The king of Yu seized the advantage of his unprotected state, and in turn obtained the possession of his territories."

fluid believed to act as a medium between mind and the grosser matter of the body."<sup>17</sup> (xv. 220) = "a kind of very subtle body which penetrates all parts of the material body and infuses them like the essence of a rose, oil in sesame, butter in milk" (Motazelite view,<sup>13</sup>)

Cf. § 118, § 136; and see 167-173.

In part it corresponds to "life principle," and also in part to "substantial form." But it is *not* the "soul"; it is one of the powers of the soul; the soul is a "bundle of life"; i.e., a bundle of faculties and powers which complete the material body. Soul: body:: vibration: atom.

**162.** We now proceed to enlarge this brief statement. On the one hand there are bodies of dense substance—the organs and tissues—which are derived from the dense particles of the humours of the corresponding temperament; and on the other there is the "breath," derived from the rarefied attenuated particles of the humours of corresponding temperament.

**163.** Physicians regard the *liver* as the seat of manufacture of the dense part of the humours, and the *heart* as that of the rarefied part. Really speaking, as soon as the breath and the appropriate temperament meet, the vital power comes into being, and thus all the members are rendered capable of receiving all the other faculties (of the soul)—sensitive and otherwise. The sensitive faculties do not appear in the breath and members until this vital power has come into being, and so even should the sensitive faculties in a given member be lost, life will remain in the part until the vital power has forsaken it. Does one not find in practice, how a limb is devoid of sensation from paralysis (whether as a result of a temperament which renders it incapable of receiving sensation or showing movement, or because of some obstruction to the current from the brain and nerves into the limb) yet continues to live? and does one not find that a limb which has lost the vital power loses also sensation and movement, dies, and undergoes putrescence and decomposes? That shows that the power which renders a member living is still there even in the paralysed member, so that sensation and movement would return again, could the obstruction be removed. In fact, the intact possession of this vital power makes the limb always ready to receive the attributes in question. That which obstructs these attributes does not interfere with the power of receiving vital breath; the member itself is not dead.

Further, it is not the nutritive faculty that prepares a member for receiving sensation and motion. It is not the nutritive faculty that is fundamental for the life of a member. One cannot say that a member perishes as soon as the nutritive faculty is

abolished. The statements just made about a paralysed limb apply equally to the nutritive faculty. For sometimes the nutritive faculty ceases in a member and still the member continues to live. Sometimes the nutritive faculty is unimpaired and nevertheless the member tends towards death.

Then again, if it be the nutritive faculty which provides the power of sensation and movement, should not plants also share in these powers?

**164.** Hence it is clear that there is something else preparing (the members for these powers), something akin in temperament to itself—and this something is the vital faculty. This is that faculty which appears in the breath at the very moment at which the breath develops out of the rarefied particles of the humours. As the philosopher Aristotle says, from that moment the breath receives its first beginning and all the other faculties flow out from it. Not that the activities of these faculties are directly derived from the breath, any more than the sensation (as doctors agree) proceeds from the animal breath in the brain until the sense-impression has passed the crystalline lens, or the tongue, or the other sense-organs. It is when the particular portion of the breath reaches the appropriate parts of the brain that it becomes impressed with the temperament of the brain and thereby becomes adapted for the operations of the faculties proceeding from and reposing in it.

The same applies in the case of the liver and reproductive organs.

**165.** The opinion of physicians differs from this. They state that unless the temperament of the breath becomes altered in the brain the breath is not capable of responding to the soul (anima, nafs), the source of sensation and movement. But they admit that the initial temperament of the breath plays a part in enabling it to receive the primary vital faculty. The same thing holds for the liver, and other principal members. From this point of view, however, there would have to be a separate soul (anima) for every kind of action; the soul would have to be really an aggregate of various souls, instead of being one single agent from which the several faculties emanate.

§ 135. Scholastic argument against such a conclusion.—“If man is to be understood as three or two (souls) using a body, it follows that man is not one thing, but two or three, for he is three souls or at least two. And if this be understood of the intellective soul only, so that the sensitive soul be understood to be the body's form, and the intellective soul, using the animated and sensified body, to be a man, this would again involve absurdities, namely that

man is not an animal, but *uses an animal*; and that man does not sense but *uses a sentient thing*. And since these statements are inadmissible, it is impossible that there be in us three souls differing in substance, the intellective, the sensitive, and the nutritive." (S. Thomas <sup>82</sup> p. 144).

If the primary temperament helps the breath to receive the primary faculty, then the vital powers, the breath and the faculties are its perfection. The primary vital faculty is not sufficient by itself to enable the breath to respond to the other faculties, but needs an appropriate temperament first. The physicians also claim that this faculty, besides paving the way for "life," itself initiates the movement of the attenuated spiritual substance (the breath, that is) towards the various members (organs), and is the agent which brings about the contraction and expansion of respiration and pulse. In that it assists life it is "passion"; in that it assists the activity and functions of mind and pulse it is "action."

**166.** The vital faculty resembles the natural faculties in that its actions are beyond the scope of the will. It resembles the animal (sensitive) faculties in carrying out contrary actions—namely, it dilates and contracts at one and the same time, effecting two contrary movements at once.

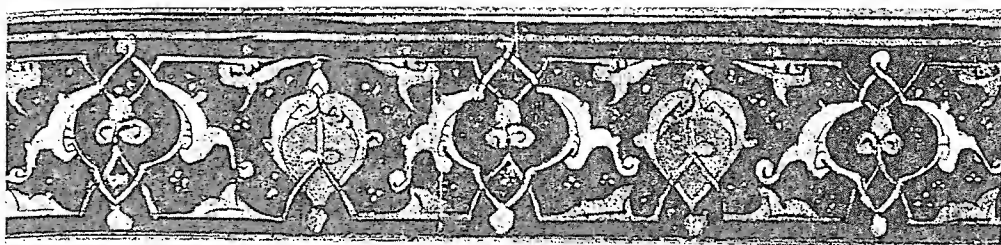
**167.** The diverse use of these terms in philosophy and medicine.—When the ancients use the word "soul" (*nafs*), they refer to the earthly or corporeal soul, the perfection of the corporeal body, which is its instrument; the source of all those faculties upon which the movements and various bodily operations depend. The natural faculty, in *medicine*, thus corresponds to the "animal" faculty in philosophy. The soul (*nafs*) is not understood in this sense but is "the power which originates understanding and voluntary movement." The natural faculty, in *philosophy*, means "every faculty from which any bodily function proceeds." But this is not the "animal faculty" of medicine but a natural faculty of a higher order than that named "natural" in medicine. So, if natural faculty is defined as "that which is concerned in nutrition whether for the preservation of the individual or of the race," then another, and third term would be required to represent this other faculty. Anger, fear, and similar emotions are passions of this same faculty, and admittedly arise from the senses, the judgment and the apprehensive faculties.

The proof of the existence of this third faculty, and of its being single or multiple, is a question for natural science, which is part of philosophy.

Expressed in another form,—

Term in Philosophy	Corporeal Soul (= lower reason)	Natural Faculty	Animal Faculty
Corresponding term in Medicine	Animal Faculty	(Higher) natural Faculty	Natural Faculty
Scope of term	Seat of movement, action, operations	Seat of passions and starting point of 'apprehension.'	Vegetative Functions

The important subject of the "breath" needs further elucidation at this point. The continuity of the "Canon" is therefore here interrupted by introducing the opening passage of "De viribus cordis," and an explanatory extension.



## THE BREATH

ITS ORIGIN, FORMS, SOURCES, AND RELATION TO THE BEING

168. I. THE ORIGIN OF THE BREATH.

**ELLAH** created the left side of the heart, and made it hollow in order that it should serve both as a store-house of the breath and as the seat of manufacture of the breath. He also created the breath to enable the faculties of the "soul" to be conveyed into the corresponding members. In the first place the breath was to be the rallying-point for the faculties of the soul, and in the second place it was to be an emanation into the various members and tissues of the body (whereby these could manifest the functions of those faculties).

169. Now He produced the breath out of the finer particles of the humours, and out of igneity ; and at the same time produced the tissues themselves (the visible body) out of the coarser and terrene particles of these humours. In other words, the breath is related to the attenuated particles as the body is related to the coarser particles of the same humours. Just as the humours are intermingled to produce a temperamental "form," whereby the members of the body are enabled to receive a physical appearance, impossible were they separate ; so the attenuated portions of the humours, being intermingled into a temperamental form, enable the breath to receive the powers of the soul—impossible were the humours separate.

170. The beginning of the breath is as a divine emanation from potentiality to actuality proceeding without intermission or stint until the form (lit. preparation, state) is completed and perfected. Each member, though derived from the self-same substance of the humours, nevertheless has its own particular temperament—for the proportional quantities of the (denser

portions of the) humours and the form of their commixture are peculiar to each member. Similarly, although derived from the same attenuated portions of the humours, nevertheless each of the three breaths (natural, animal and vital) has its own particular temperament, for the proportional quantities of the more attenuated portions of the humours, and the manner of their commixture are peculiar to each breath.

**171.** Although the body consists of several members, there is one from which they all originally arose. As to what this member actually was, there are various opinions. The fact remains that one member necessarily came to light before other members could arise out of it. Exactly the same is true in the case of the breaths. There is one single breath which accounts for the origin of the others ; and this breath, according to the most important philosophers, arises in the heart, passes thence into the principal centres of the body, lingering in them long enough to enable them to impart to it their respective temperamental properties. Lingering in the cerebrum it receives a temperament whereby it is capable of receiving the faculties of sensation and movement (sensitive faculties); in the liver, it receives the faculty of nutrition and growth (vegetative faculties) ; in the generative glands it acquires a temperament which prepares it for receiving the faculty of generation (reproduction).

**172.** The foundation or beginning of all these faculties is traceable to the heart, as is agreed upon even by those philosophers who think that the source of visual, auditory and gustatory power lies in the brain.

**173.** Some philosophers consider that the breath is made able to receive these faculties, and so be perfected, in other members (than those named). Thus, visual power results from the union of the temperament of the breath with the moist temperament of the crystalline lens ; that the auditory power results from the union thereof with the temperament of the auditory nerve ; that gustatory power is produced by the mediation of the moist temperament afforded by the soft spongy sub-lingual glands.

Others reject this view and consider that the breath carries the faculties from the brain, and receives nothing from the temperament of the member to which it travels, as nothing is necessary to perfect it. The member itself is an instrument well adapted for the action of the vegetative faculty, and contributes nothing of its own essence.

Other philosophers have claimed that the breath acquires all its powers in the heart, emerging therefrom in a state of perfection ; hence the liver and brain do not add to it.

However, a careful enquiry into the truth shows that all such views are untenable. The only possible view is that the breath obtains the perfection of the given faculty in that member which is the instrument of such faculty.

The continuation of the translation of *De viribus cordis* is resumed at 1053.



#### EXPLANATORY EXTENSION OF THE SUBJECT OF "THE BREATH."

§ 136. *Synonyms*.—"The breath of life" (Gen. 2.7 ; Quran 32-9) Souffle de vie ; Ruach (Heb.) ; Ruḥ (Persian, Arabic) ; Hu (Sufi) ; Ch'i (Chinese) ; Prana (Hindu)\* ; Hauch (German) ; Spirit (as a translation of "spiritus," for which "breath" is the better equivalent : see § 134, and § 129, footnote ; spiritus is the Latin translation of the Arabic nafs).

Primordial aura (Bruce,<sup>11</sup> p. 101) ; "ether" ; vivifying principle ; vital fluid ; vital (cosmic) force.

*Definition* : that which binds the vegetative and sensitive life into one connected whole. It is common to, and like in, *all* living things.

"That which centres in the cardio-pulmonary centre." (Baraduc.<sup>110</sup>)

"It is a subtle vapour which rises from the blood, diffuses itself to the remotest arteries, and resembles the sun in luminosity. (Ch. M.<sup>7</sup> p. 8.)

*Negative definition*.—"Breath" is *not* "respiration," "breathing," drawing in breath. Therefore it is not the equivalent of anhelitus, nafas, anfas, Atem.

The expression "he breathed his last" actually describes the departure of the "breath," but there are two events taking place simultaneously, and the literal respiration is only one of them.

It is *not* "soul" = anima. The latter is the Latin translation of the Arabic ruḥ in various passages.

It is *not* "vitality," for this is the manifestation of breath.

\* The Hindu system of physiology recognises five breaths as supporting the body. They are : Prana (the air inhaled), Apana (has a downward course), Samana (essential to digestion), Udana (has an upward course, or passes into the head), Vyana (pervades the whole body and moves in various directions, transverse and otherwise ; therefore, equivalent to the "breath" of the present section.) But Prana includes the rest, ordinarily speaking.—E. A. C., Kaviratna, Charaka Samhita, ii. 20.

Vitality stands for the vegetative soul. Thus, enfeebled vitality means lessening of the ability of the vegetative soul to accomplish some or all of its faculties.—Therefore it is *not* "life." ("Allah made life to be in breath." Night 913, Burton, <sup>104</sup> v. 422).—It is not the "vital air" of the 18th century chemists. It is not even "vital faculty." It is not amenable to either physical or chemical methods of investigation. It is not a force at all, and therefore not analogous to electricity, magnetism, heat, etc, though in the course of its activity it manifests all such phenomena.

Breath is *not* "individuality."

*Description by analogy.* Being immaterial, and representing a notion foreign to Western thought, breath is almost indefinable, whereas to the Eastern mind there seems little difficulty in the conception. Analogies—such as to flame, a pendulum, a ladder or lift to a higher plane of being, a chain linking the three aspects of the soul, to light, to vibrations, and so on—are necessarily misleading.

By picturing the breath as a sort of aura pervading the body, with a polarity correspondent with the cosmic ether (its source, whence it individualized into the human being), the conception of orientation (in time and space) becomes feasible. Angle of incidence is then to be considered, both in regard to every direction of space and to time of day. Thus an infinite variety of constitution in these respects becomes obvious.

§ 137.—*The substance of the breath.*—This is mentioned in several passages in the Canon. Though immaterial, the breath needs a material basis or substrate. The substance is described as twofold : (a) an aqueous vapour, in the case of healthy breath, as occurs when the humours—the source of the substance of the breath (169)—are healthy. (b) A fuliginous vapour, like the mist of the early morning landscape, if the breath be unhealthy—namely because superfluities are present in the humours.

A more tangible idea of the substance of the breath is furnished by taking it as partly consisting of oxygen, for the functions of oxygen in the body are the same as those attributed to the breath which it carries. Thus to quote L. S. Beale, "oxygen is necessary to disintegrate the soft formed material and combine with some of its constituents."—That is, breath=*mf*, where *m* is oxygen.

In the Hindu system, there are ten substrates for the life-breaths.—Charaka, i. 402.—But these are anatomical.

The "primordial substance" of Chinese philosophy, the ground of all phenomena, physical and psychical, fulfils the theory of the breath. It is invisible and intangible, but manifests as matter (solid, fluid, gaseous), as psychic existence, and as spiritual existence. This substance agrees with "breath" in showing cyclical changes, passing from energy to inertia, from activity to passivity, incorporeality to corporeality. The incorporeal is "the rule of existence implanted in every living being"; and "Li" is the Nature implanted by the Decree. This principle of activity appears in modernist philosophy as "mind." (Cf. Bruce,<sup>11</sup> p. 109.)

§ 138. *The constant activity of the Breath.* Were the breath not in constant activity, the body would be "dead." The activity consists of (i) changes in quality, (ii) movement from place to place. Actually, both occur simultaneously, but description would be impossible without taking each form separately.

(i) *Changes in quality.* This is a rhythmic waxing and waning in intensity; a change from a strong phase to a weak one, and back to a strong one; a change from positive to negative; an ebb and flow; a condensation or concentration ("inspissation") and an expansion or rarefaction (attenuation"). In the one phase there is attraction of energy from without, symbolized by inhaling air; in the other, there is repelling of energy from within, symbolized by exhaling air.

These *phases of movement* are represented by the terms *jelal*, *jemal* (Persian); *jalal*, *jamal* (Arabic); *shiva*, *shakti* (Urdu); Yin and Yang (Chinese);<sup>23</sup> masculine, feminine; active, passive; etc. The rise is called *Urooj* in Persian terminology, and the fall, *Nasool*; it is a rise from no intensity (incipience) to great intensity; there is a period of maximum intensity (maturation) and a fall from thence to no intensity (decay, defervescence, decline).

This cycle of the breath is continuous, but varies in rate—hourly, two-hourly, twice-daily, daily,\* weekly, monthly, seasonal. According to its changes, so does the feeling of well-being of the person change; according to its changes, so are there differences of bodily vigour in one and the same person. Every family, every race has its type of "breath." Wherever we turn in living Nature we can see the traces or signs of this "pulse of life"—in vegetable life, in animal life, even the greater range of human history itself, the rise and fall of nations, the rise and fall of pandemics; the solar and planetary cycles—all show the traces of this activity, though no doubt many would consider the connection with "breath" very intangible in these instances.

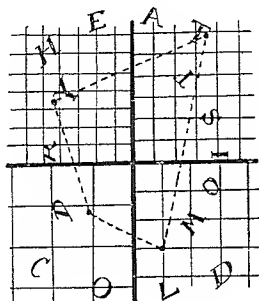
*The explanation of this activity.* This is to be found in the fact of the cyclical changes in the imponderable elements, for the two phenomena, as already suggested, are part and parcel of the same phenomenon. Thus, breath, conceived as a vibration rate, is now slow, now quick, now coarse, now fine. The range and changes of vibration from "earth" (slow, coarse) to "ether" (quick, fine), and back, as has been intimated, are associated with changes of activity of the breath. These elements are, as it were, the *points d'appui* of the breath, and they constitute an "immaterial" circulatory-system.

§ 139.—*Relation of breath to temperament and the emotional character.*—So close is the relation between "breath," "imponderable elements" and "temperament" that description of the one readily lends itself to being a description of one or both the others. If we trace changes in "earth," "water," etc., we are at the same time tracing changes in the activity of the "breath," and we use words which apply to both "temperament" of the old sense, and emotional character as spoken of to-day. Dominance of "water" is as much as

\* Chloride-retention has a cycle of three or four days (Vallery-Radot <sup>141</sup> p. 308).

to say "the breath remains in the 'water' phase over a longer period of time than in other phases—in this person." It also goes with "jemal" type of character, the exact form of manifestation varying according to other factors in the "make up"—e.g., quiet endurance, silent submission to pain, ardour of æsthetic emotion, keen sense of beauty, love of certain kinds of music, certain colours, flowers, etc. (Note, then, how intimate *this idea* of "constitution" becomes.)

The construction of a graph to represent possible variations may be helpful, as long as its essentially schematic character is realized.



The dotted area represents the supposed temperament used in the sense of 26, sqq. If it were ideal, it would be an exact square.

Note the necessity for four scales. Reflection on this diagram, in the light of the text, should bring out many points which otherwise require lengthy description. Strictly, no doubt, the diagram would be improved if it could be conceived in "solid form."

DIAGRAM OF A PERSON'S TEMPERAMENT.

To give another illustration—dominance of "fire." The following are its modes: (1) the vibration-rate of the "breath" remains longer in the "fiery" phase than in other phases and in other persons\*; or, weeks elapse before it reaches its climax (kemal stage); (2) the temperament is "fiery,"; (3) the person is called "of hasty disposition," "hot-tempered," he is "prone to anger"; (4) the climax of the fire-element may be reached suddenly: e.g., persons of "explosive" temperament or disposition; the blood "boils"; (5) the associated character is of jelal type, taking different forms according to the manner in which the patient reacts to the circumstances of life: e.g. (a) possession of great physical strength, (b) pugilistic power, (c) courageous in danger, (d) irascible character, (e) originality of thought, (f) ambition, (g) a person with unshakable gentleness, despite opposition (e.g., in some "saints"), (h) proneness to enthusiastic beneficent arts, (i) zealous character, (j) cruelty of certain kinds (other cruel persons are called "cold-blooded"), (k) strong desire. The whole range of human activity can be drawn on for opposite examples.

So also a slow rhythm of breath goes with tranquillity of mind, and a liking for poetry and music. A moderate rhythm goes with an active mind, keen to accomplish. A quick rhythm goes with energy, forcefulness, and activity to a degree liable to lead to confusion of mind and premature exhaustion of the body.

§ 140. *Relation of quality of breath to will-power.* The will-power should dominate the breath. But it cannot do so consciously if the individual is ignorant of the existence of "breath"; persons of vigorous will-power will dominate it unconsciously. It would be

\* The "ira" type, where "ira" is not simply the passion (anger), but a definite jelal-type.

easy to see that dominance of will-power by the breath should be very common, with the corollary that actions supposed to be initiated by the personality are really quasi-automatic.

The will-power may be used to "develop the breath"; that is, the way the breath flows through the body, through the various (nerve) centres.

§ 141. (b) *Relation to "innate heat."* The subject of innate heat is very prominent in the pages of the Qanun; it is closely linked with "vitality" (popular sense of the word) (e.g., "enfeebled vitality," "has very little vitality"; "full of 'vim'"). The close relation to "breath" is expressed by saying that as the breath wanes (nasool phase), the innate heat lessens; as the innate heat is restored in the course of nutritive processes, so the breath "waxes" (urooj phase). The rate of waxing and waning of the innate heat varies with the individual and shows a relation with the similar phases of activity of the breath. Innate heat is expended simultaneously with "breath," and at the same time comes that indefinable phenomenon—real enough nevertheless—called "atmosphere," "personality," "radiance," "aura."

This subject bears on the theory regarding the appearance of pathological changes in the humours. Normally, the innate heat is the agent which separates normal effete matters from healthy humours. But in disease—that is, when the cycle of the breath is not in harmony with the process of formation of the humours—injurious effete matters (acrid, corrosive, etc.) appear as by-products of the abnormal humoral state; the latter being the result either of a change in the innate heat or of a conflict between this and "foreign heat" (i.e. bacterial products: 485 : § 283).

§ 142. (c) *Relation to metabolic changes* spoken of (§ 83) under the picturesque title "dance of the elements." The picture of imponderable elements dipping down into the world of ponderable elements (or, to be precise, the individual human being), and entering into the changes of metabolism expressed as changes of pivot of function from C to O, or H, or N, or S, or P in compound after compound, and break-down into CO<sub>2</sub> or H<sub>2</sub>O, etc., or as formation of tissue cells and their subsequent necrobiosis, etc.—all this is completed by the view of the breath, passing from phase to phase, from strong to weak, not merely in one organ, but in every particle of the whole being. With the ascending phase of the breath come the formation of increasingly complex substances,—"*generatio*"; with the descending phase, goes the disintegration into simpler substances—"*corruptio*." Viewed as life-principle, we may think of the breath as controlling the vegetative faculties of the soul, which are associated by an intimate mutual relationship.

In this connection, the observation may be here noted that change of electric potential arising from the metabolism of the salts is necessary to the formation of *active* (as opposed to inert) fat in the body.

Hence physiological action—that is, anatomy in motion—is not merely a question of the behaviour of C, H, O, N, S, P, in the various

side-chains, etc. It is a sum of potentialities possessed by the separate imponderables and by their varying combinations, in the particular individual at any given time. The common denominator or collective formula which represents this sum adequately is necessarily very complex, and yet it is really essential that it be elucidated before one could be said truly to grasp the real basis of a person's ill-health, or intelligently work out the fundamental bases of prognosis.

§ 143. (ii) *The activity of movement*.—The second mode of activity of the breath consists of a cyclical movement, *a movement in place*, a movement comparable with a circulation. During the course of this movement, the breath comes successively into relation with the several tissues and organs, one after the other until it reappears at the starting-point.

The movement may be anti-clockwise as well as clockwise in the various parts of the body.

But there are two paradoxes here. Firstly, there is no period of time when the breath can be said to have passed a given point. It is not like an object going round and round, like e.g., an imaginary drop of blood. The breath is all through the body all the time. It is more as if there were a series of lights in an electric circuit, and they burning the whole time, but the intensity is changing successively from point to point. The breath is always in the great centres of the body (the "chakras, pranas"), but it is brightest in the liver at one moment, and the brain at the next and so on—yet following a certain order.\*

§ 144. Secondly, the circulation has no anatomical boundaries.† Not only this, but it is flowing left-sidedly or right-sidedly. This is transparently non-anatomical. Many would reject the possibility and even an attempt at proof would be unsatisfying. The justification for the statement that the breath is now left-sided, now right-sided, flowing down each side separately, depends on subtle observations which are beyond the scope proposed for this work. It will suffice to suggest just this: the peculiar attitudes adopted by all creatures (animals as well as men) during sleep; when standing or sitting; when exercising or at repose; also the different moods shown by a given individual—these and similar phenomena, carefully watched, furnish adequate indications of the truth of the statement. There is also a circulation along such intangible "channels" as the temperaments of the organs.

§ 145. However, there is an actual *relation to anatomical organs* as well. There is no ambiguity about this. The passage of the breath from liver to brain, from heart to tissues is orderly, and deliberately specified not only in the Qanun but in the *De viribus cordis*, lest the unwary should be misled by the faulty ideas of Avicenna's predecessors and contemporaries. The heart as the centre of life, and the seat of formation of the breath, is no mere

\* This was realized also by the Chinese physicians as shown in the *Classic on the Pulse* (vol. lxxx, p. 28)

† Possibly this idea underlies the seemingly impossible Chinese statement: "the blood is inside the vessels, the 'spirits' outside."

fancy. To speak of the flow of the breath through the major organs "awakening" each "centre" in turn (cerebral, thoracic, digestive, genital) and then necessarily reaching the lesser organs (including the tissues and cellular elements) is to give a true picture of life. To insist also that in meeting the "centres" the breath is altered; that it receives; and then proceeds in that altered or renewed form to the lesser tissues, is to fulfil the great law—the law of giving and receiving; both together; simultaneous; balanced in degree. Both are true. To omit one is to speak inaccurately because one represents only in part.

§ 146. *Application to physiological histology.*—As has been suggested, physiological histology is microscopic anatomy in motion. It is the blackboard on which can be demonstrated the reality of the truths of the scholastic conceptions. So, in studying the tissues microscopically we must remember to introduce the conception of the flow of the breath through the tissue-spaces, the juice-canals, which are also the channels of the breath. Synchronous with this flow there is an attenuation of cell-substance into fluids; and a disintegration of complex chemical substances into simpler ones. At the same time, one must say "the change in the breath *is* attenuation and aggregation of such substances."

Substances pass from the colloid to the fluid state; from the colloid to the crystalloid state; from complex to simple; and *vice versa*. They pass by aggregation from fluids into cell-substance ("assimilation"). It is all one single process. That which we see with the aid of the microscope is the "visible" manifestation of cyclical changes in atom-groups, of carbon, hydrogen, oxygen, nitrogen, sulphur, phosphorus, etc. The excrescence which we can see on the nuclear contour of the leucocytes, for instance, *is* this dominance of the several chemical elements—whether the change be the outcome of "attenuation" or of "aggregation." Not only this, but the excrescence of the nucleus is also the effect of the change in the breath which at different times belongs to different chemical elements, and so to different morphological histological appearances.

The conception of the blood-forming centres as the meeting-point of two vitalities has already been suggested (§ 121).

§ 147. *Application of the conception to pathology.* (a) Disease as the result of *interference with the freedom of flow* of breath, not only round the body, but also away from the body altogether.—It is clear that an actual obstruction in a tissue (whether it can be seen with the naked eye, or felt with the hand, or whether it is in so minute a channel that the microscope is needed to demonstrate it) prevents the flow of tissue-fluids and is the forerunner of a morbid condition—a "disease." But it exerts this effect primarily because *the flow of the breath is obstructed* and its rhythm degraded. Could the two series of events occur independently, the fact is that the former, the material obstruction, would not suffice to set up such a morbid condition.

The following are useful concrete examples of diseases produced in this way:

The dire effects produced by hysterectomy in young persons, once in much vogue for instance for severe dysmenorrhœa; and the persistent ill-health which appears when it is done in older persons round the prime of (child-bearing) life. The explanation is to be found in the destruction of the "channels" of the breath—the severance of non-medullated nerve-fibres, and even the actual removal of important nerve-ganglia. This indefinable vital component of the being, which must "circulate," goes so far, and then finds a void, and its activity is turned back on itself; there is a revulsion; and the patient is aware of a great distress which nothing will (or can) relieve.

(ii) Jejunal ulcer following gastro-enterostomy, or excision of gastric ulcer.

(b) Disease as a result of *disturbance in the rhythm* of the breath. A change of rhythm, or an ataxy of the breath, would suffice to initiate a loss of immunity to bacterial agents. Since there must also be an outflow of breath, any associated interference with its current would have the effect of holding back any of the isolated micro-organisms which are always to be found in the tissues.\*

In this way the organisms would have time to develop into active colonies. Structural organic changes then appear in the body.

When Paracelsus said that "life-principle may decompose and become a strong poison, furnishing life to innumerable, invisible (i.e., microscopic) existences, by which infectious diseases are caused," he was not speaking foolishly.<sup>29</sup> (p. 155).

(c) *Loss of balance* between the normal qualities of the breath and the functions of the body may initiate disease.

(d) The *relation between the intracorporeal cycles* of the breath and the cycles in the outer world is a factor for consideration in regard to the study of bacterial cycles in Nature, outside the bodies of animals and other human beings.

(e) Sudden *recovery from incurable diseases* should be intelligible in view of the nature of the breath. Remembering the existence of polarity, and a point of penetration into the corporeal being, and considering the fact that in disease there is a distortion of the "shape" of the breath, it is not difficult to conceive that some outer force or power breaks through and restores the polarity to normal, in which event the sick person would be once more in proper relation to his terrestrial conditions, and be freed from the interference (analogous to the interference of light) which has previously occurred in the activity of the breath. The event of such a revulsion occurring at all, whether the subsequent physical recovery be instant or only reached by gradual stages, would bring the case within the category of miraculous cure.

§ 148.—*Changes of quality of activity of the breath are simultaneous with its movement from place to place within the body.*—The two aspects of the activity of the breath must be considered simultaneously, for they are not actually separate. Thus, to sum up,

\* This fact was again called attention to recently by Sir Charles Ballance. (October, 1929; *Lancet*, 1929, 324.)

we picture the breath circulating from nutritive organs to those of the sensitive life, awakening as it does so the lower passions (the nutritive="appetite"; the reproductive="desire": see § 160; and then the higher (the emotions, the "atmosphere," the "inspiration"). The faculties of each organ are "activated" as the breath traverses them; their vitality augments, and the breath itself concurrently receives something from each "centre." The "natural" breath is the phase, then, when the breath is considered in regard to the natural or vegetative processes of the body, and is "located" in the liver, and is associated with venous blood. The "vital" breath is the phase when it is located in the heart, and is associated with arterial blood. The "animal" (or sensitive) breath is associated with the nerve-fibres. Yet there are not three breaths, but one breath—"not three souls but one soul." And the "breath" is *not* the "soul."

The changing activities of breath are associated with changes in the composition in regard to the cosmic elements; with changes in chemical composition. Movement of quality (type, rate, primary quality) goes with movement in regard to place.

The expressions "a matter-of-fact person"; an "emotional person"; a "neurotic person," in the light of the considerations presented at such length, are seen to be capable of interpretation in terms of corresponding types of "breath," which are dominant in the given individual (§ 138).

§ 149. All these changes have been analogized with a "dance." The breath is the controller of both aspects of the dance. It is the music of the dance which holds the dancers together. When the music ceases the dance ceases, or degrades into a meaningless disorder. And the ceasing of the dance is 'death'; and the degradation is the subsequent decomposition processes.

The player of the music, and the movements of the two dancers should blend harmoniously to make the perfect dance. What if there be inattention on the player's part? What if he should not correspond to the capacities and capabilities of the dancers? What if the giving and receiving between the music and the dancers should fail at any moment? Surely, then there is disease. Whatever modern medicine has to say about etiology, this fact remains at the root of the phenomena of all disease. In health, the dancers depend on the player, and their dance is so perfect that they always respond to his tune. But there comes the time when the (hidden!) Improvisor of the music cries out "Halt!"

§ 150.—The following repetition of some of the important facts so far discussed is justifiable for still greater precision.

*Abbreviations:* *a*, animal; *b*, breath; *B*, body as a whole; *C*, vital centres (heart, liver, brain, gonad); *f*, faculty; *h*, heart; *j*, vegetative; *l*, "life"; *L*, life-principle; *m*, mind; *n*, natural; *r*, rational; *s*, sensitive or sentient, or sensuous; *S*, soul in the Platonic sense; *sp.*, spirit. *v*, vital.

(a) General Statements:—

*L* exhibits *ff*, *sf*, *rf*, and *vf*.

*But L* is not the same as *ff*, *sf*, *rf*, and *vf*; or the same as (*j.s.*) *l*.

*L* is not = *ff* + *sf* + *rf* + *vf*.

*L* is not the same as *S*.

*S* is not the same as *L*; or *m*; or *sp*.

*S* includes *L*, *b*, *jl*, *sl*, *rl*, *vf*.

*b* is not *l*, or *L*, though *almost* equivalent to *l*.

*l* implies *b*.

*af* (Avicenna) belongs within the domain of *sf* and *rf* (scholastic).

*jl* (scholastic) comprises *vf* and *nf* together (Avicenna).

*sl* (scholastic) comprises *vf*, *nf*, and *some af* (Avicenna).

*sl* (scholastic) is equivalent to *nf.vf.* (*af—rf*) (Avicenna).

*rl* (scholastic) comprises *vf*, *nf*, *af* (Avicenna).

*rl* (scholastic) includes *jl* and *sl* (scholastic).

(b) Special Statements.

(i) The three chief views of the nature of a "person" are:

Modernist, or scientific or rational:

*B* + *m*.

Popular or Platonic.

*S* and *B*, or *S* + *B*.

Aristotelian.

*S.B.*, or *S* × *B*.

(ii) *The scholastic view* may be thus expressed:

"Nature" is *L.B.*; the "vegetable nature" is *jl.B*; the "animal nature" is *jl.sl.B*; "human nature" is *jl.sl.rl.B*.

(iii) Comparing the description given by Avicenna, with that given by S. Thomas, we have:

Avicenna

(*b, nf, af*), *B* (*C*)

S. Thomas

*L.B*; or (*jl, sl, rl*) *B*

\*

\*

\*



## 5. THE ANIMAL FACULTIES (SENSITIVE LIFE)

174. The animal faculties comprise those of (a) perception (b) locomotion. The former comprises (i) external senses, (ii) interior senses. Each of these exhibit five faculties.

"Now the 'Perceptive faculty' (Mudrika) is subdivided into ten branches, five of which are called the 'External Senses,' and five the 'Internal Senses.' The former are Touch, Taste, Sight, Hearing, and Smell."—(Ch. M.)

These faculties may be also designated faculties of the lower mind, or lower reason.

"Augustine says that the higher reason is that which is intent on the contemplation and consultation of things eternal . . . but he calls the lower reason that which is intent on the disposal of temporal things. Now these two—namely, eternal and temporal—are related to our knowledge in this way, that one of them is the means of knowing the other." ("p. 112).—The whole subject is to be found treated in a masterly manner in this and adjoining sections of that work.

175. A division of external senses into eight is obtained by regarding "touch" as including four senses in itself, for this is performed by more than one organ. Thus the tongue not only tastes but has a sense of touch. This view follows the philosopher.

These senses are not further discussed in the Canon. The following quotation from Chahar Maqala (E. G. Browne's translation) may be therefore added.

"*Hearing* is a sense located in the nerve which is distributed about the auditory meatus, so that it detects any sound, which is discharged against it by undulations of the air compressed between two impinging bodies, that is to say, two bodies striking against one another, by the impact of which the air is thrown into waves and becomes the cause of sound, in that it imparts movement to the air which is stationary in the auditory meatus, comes into contact with it, reaches this nerve, and gives rise to the sensation of hearing.—*Sight* is a faculty located in the optic nerve which discerns images projected on the crystalline humour, whether of figures or solid bodies, variously coloured, through the medium of a translucent substance which extends from it to the surfaces of reflecting bodies.—*Smell* is a faculty located in a protuberance situated in the fore part of the brain, and resembling the nipple of the female breast, which apprehends what the air inhaled brings to it of odours mingled with the vapours wafted by air-currents, or impressed upon it by diffusion from the odorific body." It is really a very delicate kind of *taste*. The sense of *taste* detects soluble nutriments in those objects which come in contact with the tongue, discriminating between sweet, bitter, sharp, sour, etc. The sense of *touch* is distributed throughout the skin and flesh of the animal, the nerves thereby perceiving and discerning anything which comes in contact with them—such as the four primary qualities: dryness, moisture, heat and cold; and the secondary qualities of roughness, smoothness, harshness, softness.

The five sounds, the five tastes, the five colours, are simply manifestations of the five elements (cf. Forks<sup>2</sup>, p. 238). "Your taste, your seeing, your hearing, etc.—these are the elements; so say not they exist not!"

## 176. THE INTERIOR SENSES.—

There are five groups of interior faculties : the composite, the imagination, the apprehensive or instinct, the retentive or

memory, and the ratiocinative. The first two are taken together by the physician, but not by the philosopher.

**177.** *The Composite sense* (= *Common sense*: Hiss-i-mushtarik) is that which receives all forms and images perceived by the external senses, and combines them (into one common mental picture).

Site: Anterior Ventricle of Brain (Ch. M.)

The sensations of sight, smell, touch, afforded by an object are conjoined, and the qualities perceived by the different senses become gathered into one single percept. This faculty exists in virtue of the fact that all sensation and muscular action are two aspects of one process. With the exercise of every sense-organ there goes an exercise of muscular action, and the latter cannot occur without at the same time arousing muscular sensations, because sense-organs for muscular senses are everywhere present along the fibres of which the muscles are composed.

**178.** *Imagination.*—(*Phantasy.*) This preserves the percepts of the composite sense after they have been so conjoined, and holds them after the sense-impressions have subsided. The common sense is the recipient and the imagination is the preserver. The proof of this belongs to the philosopher.

The chief seat of the activities of these two faculties is the anterior part of the brain.

§ 151. Regarded from the scholastic point of view, the imagination may be distinguished into (*a*) *sensuous*, (*b*) *rational*, or *intellectual*. The former is equivalent to Avicenna's term, for it concerns itself with natural objects. The second form is concerned with ideas, is creative or productive, and manifested as "invention" (artistic, mechanical, scientific, etc), whereas sensuous imagination is simply reproductive. But in both cases the faculty is defined as "the power of forming mental images or representations ("phantasms") of material objects *apart from the presence of the latter*" (Maher, p. 163).

Source of the images: (*a*) the sensations, emotions and actions of the body; (*b*) trains of thought, which are chiefly on the higher plane of rational life; (*c*) the intellect; (*d*) other external influences, such as other minds, whether human or angelic.

The difference from "common sense" is that the latter only deals with objects *while present*.

**179.** *The Cogitative Faculty.*—The faculty which medicine calls cogitative is taken in two senses in philosophy. It is regarded sometimes as "imaginative faculty" [*mutakhayyal*: animal] and sometimes as "cogitative faculty" [*mutafakkira*: human].

In the view of the philosopher, the former is where the apprehensive faculty (q.v.) comes into play, and the latter is where reason controls or decides that a given action is advantageous. There is also the difference that the imagination deals with sense-form percepts, whereas the cogitation uses the percepts which have been stored in the imagination and then proceeds to combine and analyse them, and construct quite different images : e.g. a flying man, an emerald mountain. The imagination does not present to you anything but what it has already received through the sense-organs. (p.)

The seat of this faculty is in the mid-portion of the brain.

It combines or separates, as the mind selects, those particular percepts which are stored in the imagination.

It is clearer to place the cogitative faculty into the higher " plane " of rational life. It really belongs partly to the intellectual imagination, and partly to the rational faculty, the understanding.

**180. The apprehensive faculty.**—This faculty is the instrument of the power called *instinct* in animals. (" *Animal prudence*." ) By it, for instance an animal knows that a wolf is an enemy, and the kid distinguishes its dam as a friend from whom he need not flee.\* Such a decision is not formed by the reasoning powers, but is another mode of apprehension. Friendship and enmity are not perceived by the senses, nor do the senses comprehend them ; and they are not perceived by the reason either. Man employs the same faculty on very many occasions exactly as does an irrational animal.

*Apprehensive faculty v. imagination.*—The former executes a judgment ; the latter simply stores sense-perceptions.

*Apprehensive faculty v. cogitative faculty.*—The former relates to one single act ; the latter does not make a judgment, but opens the way to a series of discursive processes and decisions. The cogitative faculty is concerned with the synthesis and analysis of sense-impressions whereas the apprehensive faculty makes a judgment on the super-sensuous ideas in the particular sense-percepts. The cogitative faculty is concerned with forms perceived by the senses ; the apprehensive faculty deals with derivatives therefrom (" suprasensuous forms. ")

¶ Some writers however call the apprehensive faculty " cogitative " as a matter of convenience, saying that the terms are unimportant as long as one understands the things themselves and the primary differences between them.

\*Or, as a child distinguishes between a spotted rope and a serpent, and discovers the suprasensual ideas existing in particular percepts. (Ch. M.)

§ 152. Clearly, the apprehensive faculty of the text covers both "lower reason" and "reason" as ordinarily understood. The former is also called "instinct." The difference between the two is easily defined in theory, but difficult to apply in practice. Instinct is "the sense of what makes for the well-being of the individual." "Concrete relations are perceived without an abstract conception being formed. Instinct therefore differs from reason in the *absence of abstract universal knowledge*. At either end of the scale, the external manifestations are clear and absolute."<sup>50</sup>

§ 153. Instinctive actions may be described as highly complex reflexes, the movements being spread over a (variably) long time-period, and appearing after a (variably) long interval. Thus we have:

- (a) sensory stimulus—>lower nerve-centres—>immediate reflex movement;
- (b) the stimulus of a perception—>higher nerve-centres—>a series of complex movements.

(a) need never reach consciousness; (b) goes on without a consciousness of the general (not "particular") end or purpose of the movements.

While the subject of instinct is always discussed in regard to the actions of animals, it should be admitted that nine-tenths of our daily actions really belong exactly to the same plane or order. The use of the expression "lower reason" enables a vast number of particular instances of animal behaviour to be classified along with many similar actions performed by man, perhaps especially during childhood.

Much of the difficulty about instinct versus reason in animals is avoided in this way. It is also to be noted that while speech and language exist in various orders of creatures, *articulate* speech occurs in man alone (Bock<sup>114</sup>). Animals can express their own emotions to one another, and can understand our speech in that it conveys emotion. But that is different from the reasoning processes which scholastic philosophy limits to man.

**181.** The apprehensive faculty need not be considered much by the physician because disorders in it are always consequent on disorders in the prior faculties of imagination, and memory, as we shall show later on. It is only necessary to consider those faculties the disturbances of whose functions bring on disease. It is enough to know that the lesions in one which are interfering with the other arise in the temperamental state of the member or in depravity of its constitution. For on this knowledge depends the selection of the remedy and how to guard against the disease. Not to know about the state of a faculty which is affected only indirectly is of less moment compared with accurate knowledge about a faculty which is affected directly.

**182.** *The Retentive Faculty. Memory (Ḥafīza, Dhakira).* The power of memory is as it were a treasury or repository for those supra-sensuous ideas discovered by the apprehensive faculty, just as the imagination is the treasury or repository for the sense-impressions of forms and sensible images (formed by the common sense). The seat of this faculty is in the posterior region of the brain.

The philosopher discusses whether apprehension and memory are to be taken together or separately. Is apprehension merely a treasury of reflection? To the physician this problem is irrelevant because the same noxa, be it an intemperament or a depraved constitution, would affect both and in either case the seat of disease would be in the same region of the brain.

The apprehensive faculty : memory :: common sense : imagination. But the composite sense preserves forms, and memory preserves ideas—the ideas discovered by judgment (Wahm). (Ch.M.?).

§ 154. In scholastic philosophy, the memory is two-fold—sensuous and rational. *Sensuous memory* is the power of retaining, reproducing and recognizing the representations of past experiences, and of referring an event to its place in time. The concrete objects of memory under this category are : memory of size, form, position, weight, sounds, rhythm, scent, colour, faces, persons and of certain events. The degree of capacity for memory in regard to each of these varies widely, producing various “types,” such as auditory, visual, motor, etc.

The memory of emotional states is called “affective” memory.

*Rational memory*, the power of recollection, reminiscence, the power of active recall, volitional memory.—This is restricted to man (Maher,<sup>50</sup> p. 180).

183. There is still one more faculty distinguishable in the mind, namely, the ratiocinative ; the understanding. Physicians do not concern themselves with this any more than they do with the cogitative faculty, and for the same reason. They only study the operations of the four other faculties.

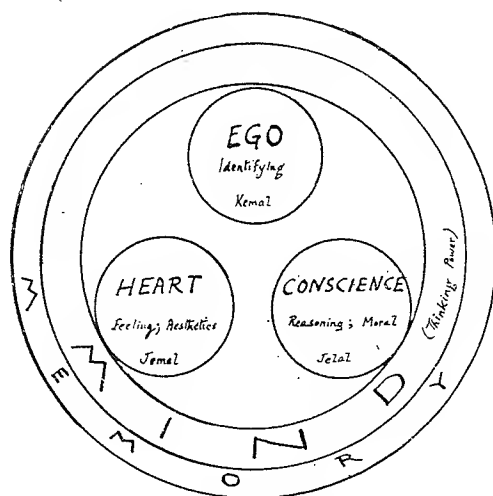
§ 155. Charts devised in order to co-ordinate various terminologies applied to the sensitive and rational faculties.

Higher	5. Ratiocinative Faculty	
	3. Cogitative Faculty	4. Memory
	3. Apprehension	
Lower	2. Imagination	
	1. The Common Sense	

I. AVICENNA.

Lower		Higher	5. Thinking	
			3. Perception	Faculty
		4. Memory		
		2. Imagination		
		1. The Common Sense		

II. ARABIC (Nt. 449).

III. (Modern) Sufi<sup>38</sup>

Thought (of God)				
Heart: sirr; qalb; ruh				
Intelligence (‘aql)				Higher Will; Attention Hamm
Reason; logical faculty “The blamer.”	Judgment “The Watcher” Wahm	Reflection Cogitative faculty Fikr	Intuition	
Perception	Phantasy Khayal	Memory (of ideas) Dhakira	Memory Hafiza	Lower Will Nafs
Perception Mudrika				

IV. JILI<sup>32</sup> (p. 170)

Conscious	Reasoning		
	Insight		
	Concentrating power		
	Volition		
Subconscious	Conduct		
	Ideation		
	Association of Ideas		
	Sense-memory	Instinct	Emotion
	Perception		
	Stereognosis		

V. MODERN<sup>139</sup>  
(Psychiatric)

Human   Animal	UNDERSTANDING		
	Intellect		
	Power of thought		
	Supra-sensuous.	Reason	Supra-sensuous
	Imagination	.....	Memory
	Sensuous	Instinct	Sensuous
The Common Sense			
Perception			

VI. SCHOLASTIC<sup>50</sup>

NOTE.—These and innumerable other views regarding the faculties of the “mind” are partly accounted for by difference of purpose in view. In ancient medicine, everything was related to the cosmic elements; in modern medicine, anatomy is all-important. In regard to mental diseases, cortical structure (strata of types of nerve-cell) is naturally a basis of interpretation. Many modern textbooks of psychology consider principles of education of the young. Moral philosophy has another object in view. Eastern mystics regarded the matter in terms of the problem of attaining elevation of the soul to God. Standard modern Catholic teaching envisages all such aspects, without making clear the links between “theoretical” faculties and the actual microscopic anatomy and histological physiology of the human body. But these links are the essential interest in this treatise, and are outlined in the special chart described and discussed in §§ 157 sqq.

## 6. THE POWER OF LOCOMOTION

184. This power is that which contracts and relaxes the muscles whereby the members and joints are moved, extended or flexed. This power reaches the limbs by way of the nerves and there are as many forms of power as there are of movement. Each muscle has its own peculiar purpose and it obeys the decree of the composite sense.

§ 156. That the soul is endowed with a locomotive faculty is simply an ultimate fact. Our life-long experience assures us that mind and body do interact, but *how* we cannot tell. (Maher 220).

The skeletal system is the instrument of animal life.

Movement occurs in plants, but so slowly that it was not positively discerned till recent years, and is not a “locomotion” (see § 128).

## 7. THE FUNCTIONS (OF THE BODY)

185. Some of the functions are carried out by one single faculty; others by two together. The former is exemplified by *digestion*, the latter by the appetite for food, where there is (1) the vegetative faculty of attraction, (2) the faculty of sensation located at the mouth of the stomach. The faculty of attraction is achieved by a contraction of the longitudinal fibres which draw the object inwards and extracts from the humours that which is required. The faculty of sensation enables the organ to be aware of the acidity of the atrabilious humour, for this it is which excites appetite. In saying that this one function

is achieved by two faculties together, one relies on the fact that a nocument befalling the faculty of sensation destroys that "desire" which is called hunger and appetite. Even the need of nutriment does not account for "desire."

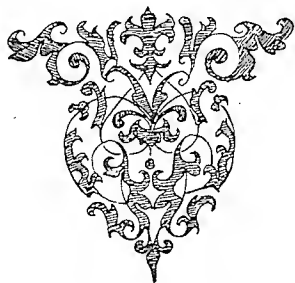
**186.** The function of *swallowing* is another instance of a dual faculty—that of attraction and that of propulsion. The faculty of attraction is achieved by the longitudinal fibres at the orifice of the stomach and oesophagus; that of propulsion is achieved by the voluntary muscles of swallowing. Loss of either power renders deglutition very difficult; even retarded activity, without actual loss, renders the act difficult. Every one knows that lack of appetite for a substance makes swallowing difficult. If a thing is repugnant, and yet we wish to swallow it, our appetite and power of attraction is so frightened away that the function of voluntary deglutition is made difficult.

**187.** The function of *transmission of nutriment* along the alimentary tract is achieved by the faculty of propulsion forwards of the portion containing the nutriment. It is associated with the faculty of attraction exerted by the succeeding portion.

**188.** The *discharge of waste matters* is also a two-fold function. Sometimes both sensitive and vegetative faculties initiate the function simultaneously.

**189.** In some cases a faculty is associated with a quality. Thus *cold* holds material, and also arrests the flow of humour (or intestinal contents) either absolutely by repressing its formation or relatively by driving it back. Cold restrains by (1) congealing the material (rendering its particles closely aggregated), or (2) narrowing the pores. Incidentally it has a third action—(3) that of obliterating innate heat (which is concerned with the faculty of attraction).

**190.** *Heat.* Heat attracts by the ways already mentioned. Heat and the urge occasioned by (relative) vacuum first attracts the attenuated matter, and later the denser matter. The vegetative faculty of attraction only attracts the things most appropriate for it, or things whose nature it is to be attracted. Consequently it might happen that the denser (more concentrated) matter, being more suitable and appropriate, and responsive, is attracted first.

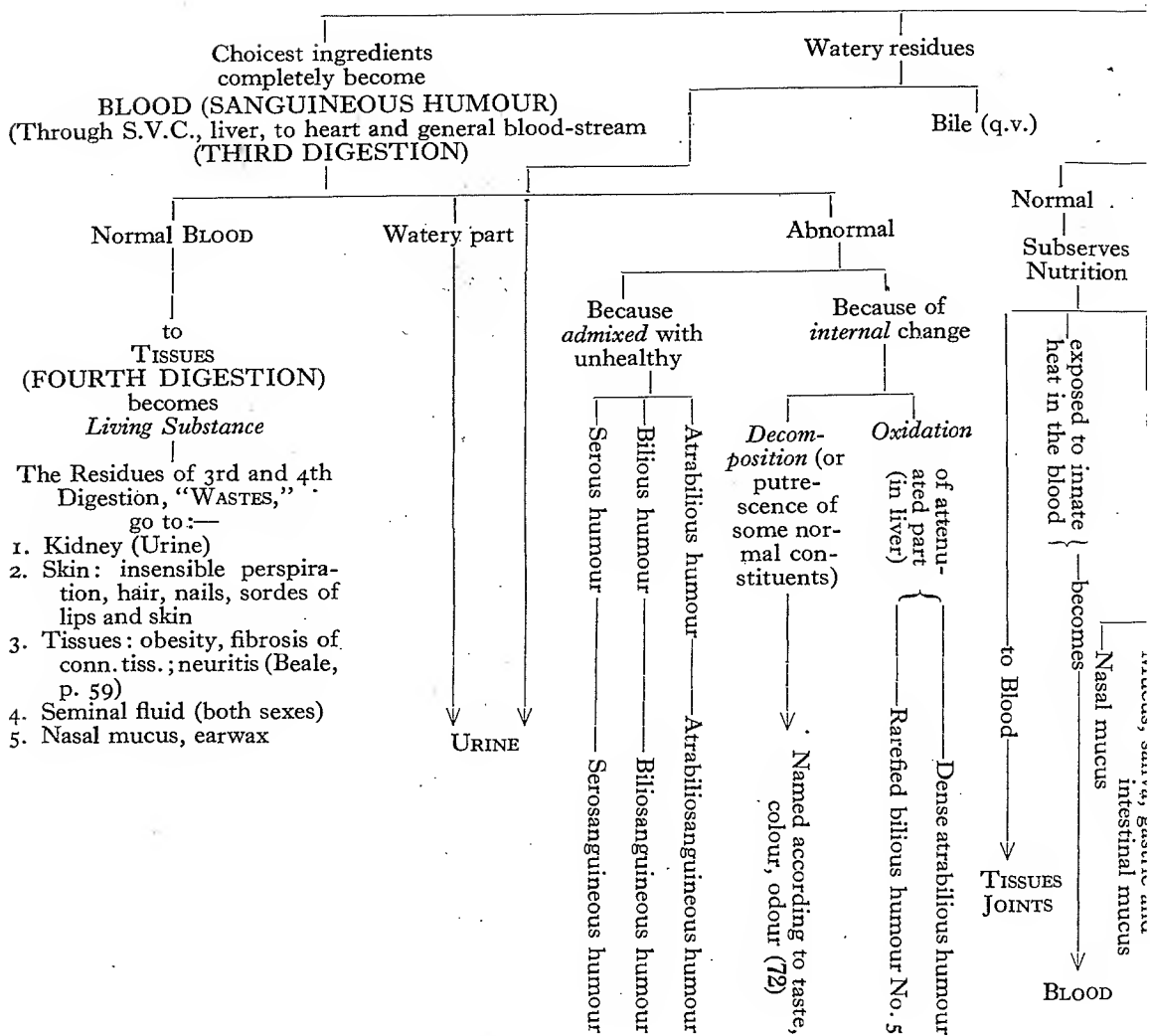


MOUTH .. .. .

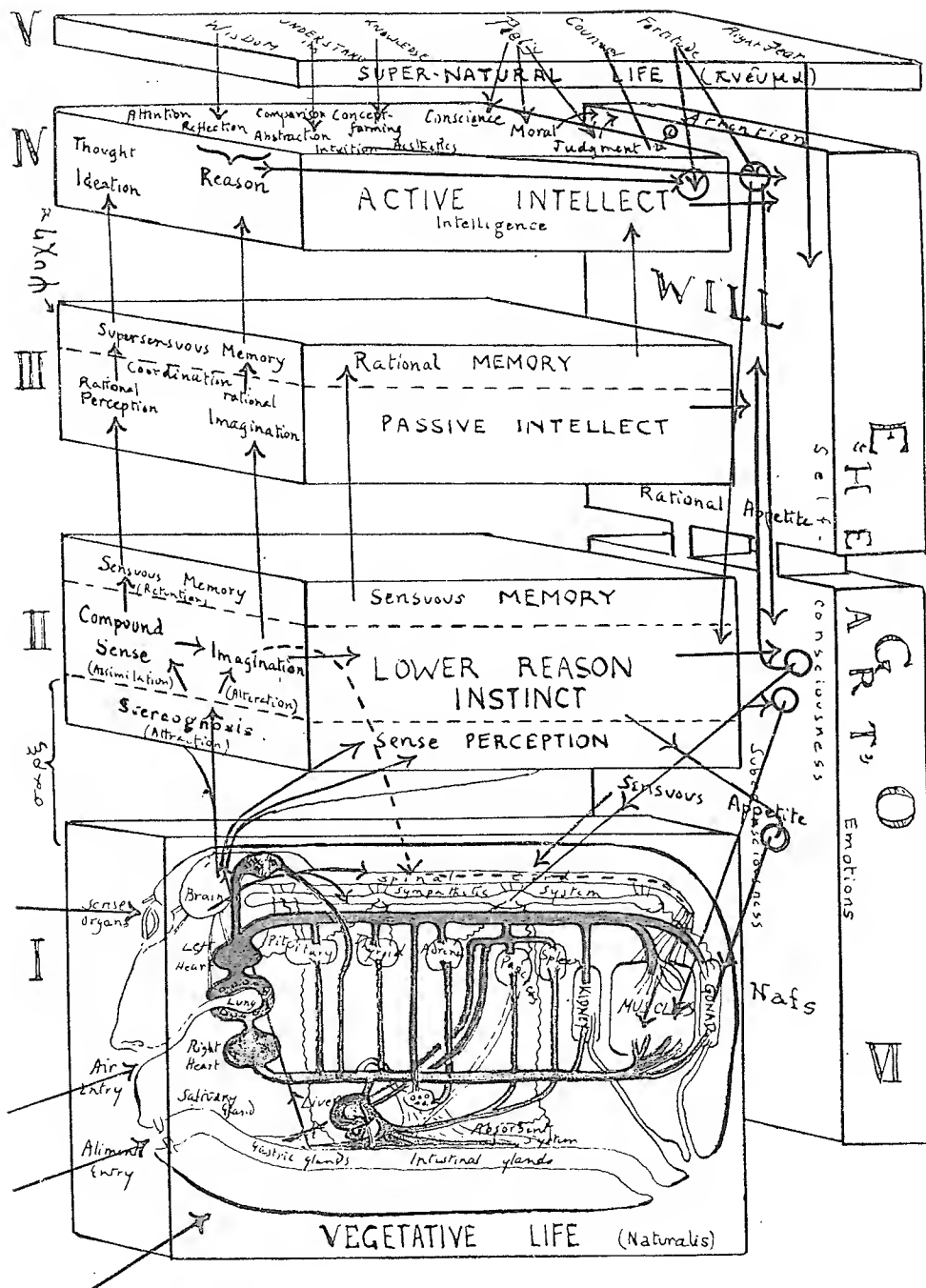
STOMACH .. .. .

SMALL INTESTINE .. .. .

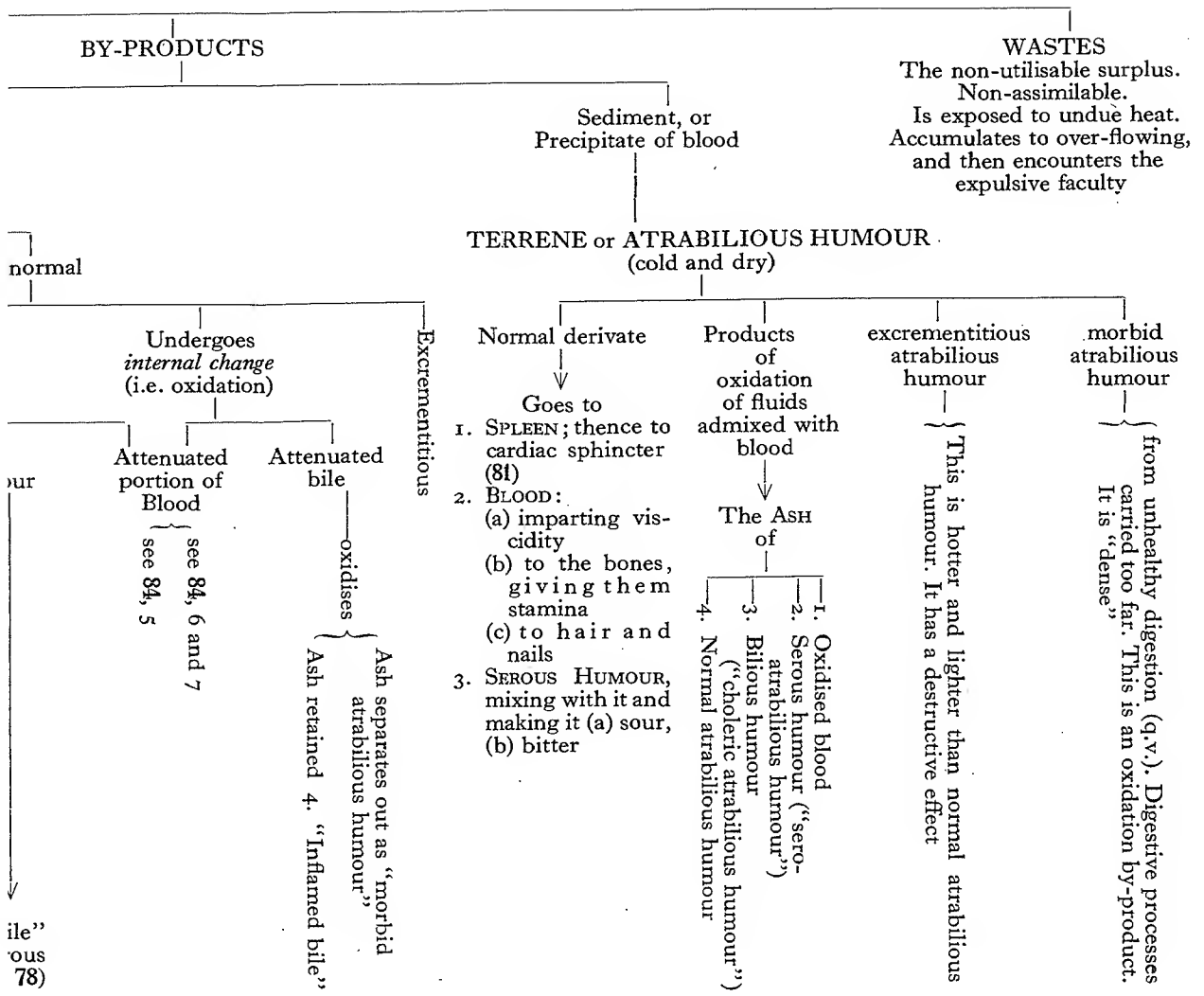
LIVER .. .. .





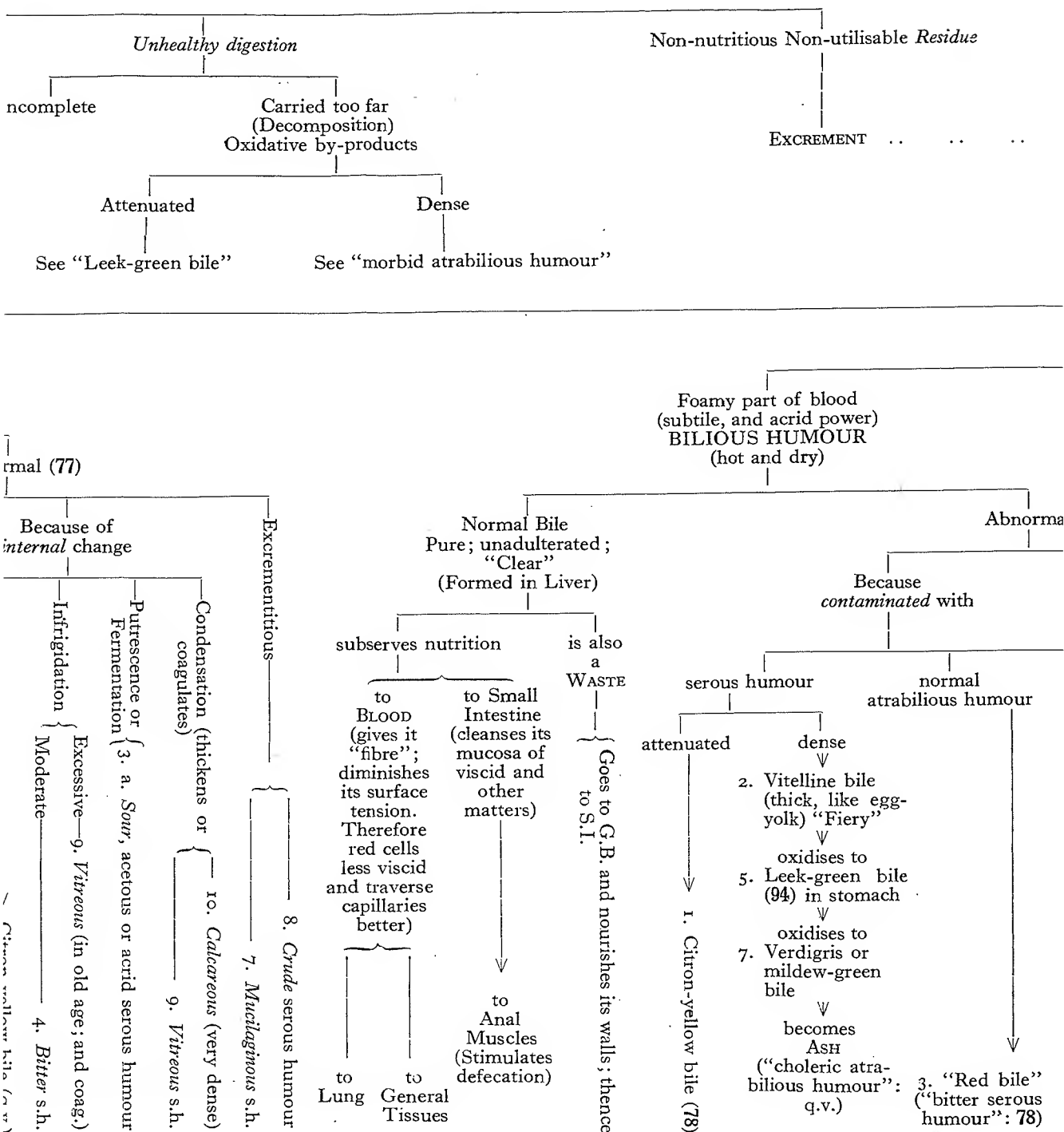








# ING SOURCE AND FATE OF THE FOUR HUMOURS





# CHART SHOWING

MOUTH .. .. .

FOOD AND DRINK  
(FIRST DIGESTION)

STOMACH .. .. .

Utilisable part (True Pabulum)

SMALL INTESTINE .. .. .

Chyle, diluted with fluids  
of the meal

Incom

LIVER .. .. .

Through mesenteric veins,  
portal vein, to  
LIVER  
(The liver swells)  
(SECOND DIGESTION)  
via Sanguificatory Power

Sei

Watery residues

Less choice ingredients  
of the Food

SEROUS HUMOUR  
(Cold and moist)

OUR)  
blood-stream

Bile (q.v.)

Abnormal

Normal

Abnormal (7

Subserves  
Nutrition

Because  
admixed with

Beca  
interna

Because  
admixed with  
unhealthy

Because of  
internal change

Decom-  
position (or  
putre-  
scence of  
some nor-  
mal con-  
stituents)

Oxidation  
of attenu-  
ated part  
(in liver)

exposed to innate  
heat in the blood

—becomes

Mucus, saliva, gastric and  
intestinal mucus

BLOOD

TISSUES  
JOINTS

Blood

Bilious humour

Atrabilious humour

Attenuation

Lighter portion (very thin) {  
5. Watery  
6. Insipid

Moderate — 4. Bitter s.h.

Citron-yellow bile (q.v.)

in the veins — 4. Bitter  
acid — 3. b. Sour, acetous or acid

oxidised — 5. Watery

occasional — 6. Insipid ("bilious serous  
humour")

ordinary (contains  
salts: 75)  
putresces  
2. Salty  
serous  
humour  
(light)

1. Sweet serous humour

In catarrhal exudates

In saliva

Named according to taste,  
colour, odour (72)

Dense atrabilious humour  
Rarefied bilious humour No. 5

Atrabilious humour — Atrabiliosanguineous humour

Bilious humour — Biliosanguineous humour

Serous humour — Serosanguineous humour

E





## THE CORRELATION OF THE VARIOUS FACULTIES.

(Summary and extension of Thesis VI.)

§ 158. The correlation between the various faculties with the inter-connections between the visible bodily organs is usefully indicated by means of a suitable map or chart.

The following considerations are necessary in studying the accompanying map. (1) There are no actual boundaries between the faculties, even in the case of the discrete viscera. The internal senses are "merely diverse aspects or phases of a single sensuous faculty" (Maher,<sup>50</sup> p. 96) as Aristotle perceived. To name "departments" of the mind, it must therefore be constantly remembered, is simply to help the memory, and assist analysis of the various mental operations. (2) Subdivision of faculties into "animal" and "human" is to be avoided. (3) The enumeration of mental faculties given by phrenology is not vitiated by the fact that phrenological charts are not anatomically correct. (4) Since the strength of one faculty involves a corresponding weakness of some other, even the very existence of the faculty may be virtual.

### § 159. BRIEF DESCRIPTION OF THE CHART.

Six discrete "planes" are represented, and are named according to certain terms selected from those used in various classifications. The vertically placed plane serves to indicate a close relation between this and each of the horizontal ones.

*Plane I.*—This refers to the *vegetative life*, and shows the various organs and their inter-connections, as well as their relations to the superposed planes. Connection with the lower extremity of the vertical plane indicates the existence of "unconscious appetition" in this sphere of life. This, the so-called "natural appetite," is defined as "the inclination towards a thing which is in concord with its nature, without any knowledge of the reason why such a thing is appetible"<sup>17</sup> (I, 656). It is inherent in the nature of "being" on this plane.

Appetite is (a) natural (hunger, thirst, sleep, exercise, sex) (b) sensitive (reflex, instinctive), (c) rational. The two former depend on organic conditions, which are not regulated by reason. The sensitive appetite is under the control of the will, and can be strengthened or checked thereby.<sup>17</sup> (i. 656). Appetite, in the sense of sinful desire, belongs to another aspect of the subject.

*Plane II.*—This refers to the *sensitive life*. Sensitive life comprises the "power to know" (i.e., the faculties already discussed

in 176-183 of the Canon, and shown in the charts in §155), and the "power to love" (= "appetition" = "the power of loving that which is *the good for the individual*" = appetitive faculty = desire). The power to know is represented by Plane II and the power to love is represented by the lower part of the vertical plane. Both find their realization in organs depicted on Plane I.

"Lower" is used as equivalent to "animal" (as opposed to human). Scholastically it is the antonym of "higher." "Reason," again, is made equivalent to "instinct" because popularly the latter word is taken to be the same thing as automatism. In scholastic philosophy the phenomenon of instinct is appraised properly. Hence "lower reason" comes to be applicable for a certain series of phenomena, for that which scholastically is called instinct is that which in modern life is called "lower reason." The word reason should however be applied strictly to those higher operations which scholastics define with masterly precision.

Coincident with the mental representation of the thing—whether it be good or evil for the individual—there is an agreeable or disagreeable passive state of consciousness, and this is called an "*emotion*." Emotions are subdivided into "concupiscible" and "irascible." The former imply attraction or repulsion, and are: love, hatred; desire, abhorrence; delight, sadness. The latter concern the sense of self-preservation. They are: hope of acquiring an object which it is difficult or dangerous to obtain; despair of so doing; fear of a threatening evil or danger, with impulse to flee; courage, when there is an impulse to remain; anger.

The objects of each of these emotions are: concrete objects, whether inanimate or living; muscular activity; experience (excitement, adventure); emotion itself. For example, there may be *fear* of hunger, cold, lack of necessities of life (clothing, etc.); of illness; of death; of punishment, of reproaches, of tears; of loss of prestige or reputation, of being misjudged or considered eccentric; fear of failure.

*Planes III and IV* together refer to the *rational life*. They appear separated in order to bring out the idea of active and passive intellect. They stand for: the "power to think." The vertical plane belongs with these two planes as representing "the power to will."

The power to think, or *Understanding*, is regarded as two-fold—*speculative* and *practical*. The former, under the influence of the will produces the act of contemplation, the object in question being purely ideal (poetry, music, art, refinement, taste). It sees resemblances, sees the "simplicity" of creation, and makes even the most thorough difference seem quite secondary and insignificant. It includes foresight, research, "wisdom." The *practical* understanding, under the influence of the will, and by the use of the physical body, accomplishes constructive work.

The power to will, or "rational appetite," precedes voluntary movement. The inclusion of the terms "attention," "consciousness," "heart," "ego," on the vertical plane, is for convenience and does not imply synonymity in every respect.

*Plane V*, as representing the "supernatural" life, is only introduced for completeness, and its relation with the "lower" planes, though intimate, is purposely not specified. Its necessity was perceived by Jili (taken as a representative of Islamic mysticism, by Nicholson<sup>62</sup>) when he discusses the "perfect" or "ideal" man, and some of its features appear in the chart representing his views (§155). The subject belongs primarily to theology.

§ 160.—DETAILS REGARDING THE EMOTIONS.

(1) It will be seen that there is no separate account of the Emotions in the Qanun. They are only referred to incidentally, except in the chapter on the Pulse (601) which describes the effect of five particular emotional states on the Pulse.

(2) While classification of the emotions is unsatisfactory, as Maher<sup>50</sup> points out, the short list given by Avicenna is convenient in practice, because every patient may be regarded as fundamentally governed by one or other, the others being relatively unimportant.

In this section such emotions as æsthetic and moral feeling are not considered. The self-regarding emotions are referred to under "Ego" (§ 164, IV).

(3) EMOTIONS AND THEIR CORRELATIONS.

	I.	II.	III.	IV.	V.
Latin name ..	Gaudium	Laetitia	Tristitia	Ira	Timor
Arabic name ..	Surūr	Lazzat	Gham	Ghaḍab	Faz'
Chinese name ..	Hsi	Ai <sup>4</sup>	Ai	Nu	Chū
Translation ..	Joy	Delight Concupiscence*	Sorrow	Anger Hatred*	Fear
Corresponding Element:					
Sufic ..	Aether	Air	Earth	Fire	Water
Chinese† ..	Fire	Earth	Metal	Wood	Water
Corresponding phase of breath†	Jelal	Jemal	Jemal	Jelal	Jemal
Dominant Humour corresponding	Sanguineous	Sanguineous	Atra- bilious	Bilious	Serous

(4) *Relation between the emotions and the "elements."*—There is not a strict relation between individual emotions and individual elements. As has been explained, all the elements occur together, though one may be said to be more frequently dominant than another.

\* The Chinese speak of seven chief emotions, concupiscence and hatred being the two additional ones. Instead of "delight," "liveliness," and "love" are equivalents of "ai"<sup>4</sup>

† In theosophical language this relation is expressed by saying that emotions belong to the "astral" plane.<sup>29</sup> (p. 167).

‡ Su-Wên (Forke<sup>23</sup>; Wiegner<sup>144</sup>).

The same applies to the phases of the "breath"—the degree of vitality. Every emotion goes through three phases of activity—rising, acme, falling,—as do the types of breath. Hence different words are required to describe each emotion according as it is weak, strong, balanced, pure or mixed. (See § 139, § 164, II.)

This complexity is illustrated by the following instance—the *relation between "anger" and "fire."*—"Fire varies from dull smouldering to a red-heat, and so to flame—flicker, lambient, gentle, pale, lurid, sudden flare, continued light of different degrees of intensity, fierce burning, ferocious fire. The phrases: one's blood boils, he flared up,—and so on, are graphic enough. Actually, the vessels engorge, the muscular power is intercepted, the mind becomes confused; the bile is set in motion, and may be expelled from the gall-bladder, leading to relief (bodily as well as mentally), or enters the blood more freely, engendering heat, and increasing both the acid and the bitter throughout the body. Whether a person is irascible, or is difficult to rouse to anger, whether the passion will smoulder (and hence show as a resentment, and spirit of vengeance) will depend on whether the humours are mixed or whether one or other is definitely preponderant in the resting state.

An angry person gives out a definite atmosphere, a feeling of being "on edge." The effect on bystanders depends on *their* dominant emotional state; in some it provokes quarrelsomeness, in others perplexity owing to the discovery that the person is unapproachable. Silence and appropriate interior exercises are indicated. Angry words produce mental "sores"; they may heal, or they may be kept going, or they may be re-opened, or become incurable.

An outburst of anger may be provoked by a clash of interests. These vary widely. Thus, two wills may clash; the function of one organ may clash with that of another (e.g. menstrual irritability or outbursts of temper); clash of duty with self-will. The intensity of the outburst is according to the principle of *jelal-jemal*.

Anger may be manifested as a "liver-storm" (variable duration), "storms" from stagnation in connective-tissue spaces (longer duration), "nerve-storms" (short duration), "mind-storms" (leading to criminal acts). These phenomena may come on unawares.

(5) *Physical effects of emotional disturbance.*—The effect of anger on bodily functions has been referred to. Fear may manifest as gastric trouble, indigestion, constipation. Panic-fear may provoke diarrhœa, and polyuria. The blood becomes flooded with toxins, and the kidneys are taxed in consequence.

The *blood-state* is altered during the sway of emotions (Cf. 1090.) The *blood-cell formula* may also alter.

The *humoral formula* changes during emotional phases, but there is no rigid relation to be assigned. Those given in the table are not absolute.

*Analysis of a total emotional process.*—Viewed as a complex process, the following components must be considered in regard to a total emotional process: (i.) A cognitive state associated with a nervous change in the cerebral centres (a), (ii.) a conscious appetency or impulse excited by (a) associated with a diffused outgoing

process along motor nerves (*b*), (iii.) bodily commotion caused by ii. + *b*; this reaches consciousness through sensory nerves (*c*). Psychically, the emotion is made up of i + ii. + iii.; physically it comprises *a* + *b* + *c*. (After Maher,<sup>50</sup> p. 446).

§ 161.—DETAILS CONCERNING SOME OF THE FACULTIES AND PHENOMENA PERTAINING TO RATIONAL LIFE.

The term "*Mind*" is variously defined. It is taken as synonymous with (*a*) intellect; (*b*) intelligence; (*c*) consciousness, conscious intelligence; (*d*) the nervous system; (*e*) the brain (thus, behaviourists employ "mind" for "brain" from a dislike of the materialistic sound of that word<sup>156</sup>), (*f*) the entire psychical being. It is defined as (i) a sum-total of the mental processes (Howell's Physiology); (ii) that which thinks, feels and wills; (iii) "the terminus of an evolutionary progress from reflex and tropism by way of memory and imagination to intellect and reason"; (iv) "mind is to be interpreted in biological terms, as an organism, an organ of adjustment, a structural fabric" (Purposive school of psychology).<sup>156</sup> "Mind" is analogized with a room, in which the soul lives; with a mirror which reflects every thought coming into it. The purpose of this analogy is to illustrate differences between individuals just as there are different kinds of rooms, styles of decoration, coloured windows.

The *scholastic definition* of the mind is that it is the proximate principle of understanding, and designates rational life as opposed to sense-knowledge. Mind is not a special power over and above the memory, intelligence, and will, but is a potential whole comprising these three. It includes all those powers which in their operation are entirely removed from matter and from material conditions. (St. Thomas, *Quaestiones Disputatae*, De Veritate, x. 1; and ad 12; Sum. Theol. 77, a. 5.)

*Activity of mind*.—This may be considered in three aspects: mobile, rhythmic, and chaotic. The former is shown in gentleness, generosity, gratitude, goodwill, easy-going disposition. Rhythmic activity is shown in reason and logic; in business-like character; moderation in love and hate, likes and dislikes. Chaotic activity is shown in intolerance, suspicion, imprudence.

A. *The Intellect*. (Plane III, IV).—The active intellect is defined as the power of abstracting, whereby the object obtained by the senses (the image stored in the imagination) is disengaged from its individual conditions and rendered intelligible. It "abstracts from the representations of concrete things or qualities, the typical ideal essential elements, leaving behind the material and particular" (I. 74), "manipulating them like algebra without immediate reference to the concrete." It considers things apart from quantity, quality, place, and time.

*Relation of intellect to corporeal organs*.—Intellect is a function of the mind alone; it is not exerted by means of any organ (Maher<sup>50</sup>, p. 239, 240). Intellectual activity depends *extrinsically*, or *per accidens*, on the organic faculties, as the schoolmen said (ib. p. 241). Intellect is a spiritual faculty.

Whereas sensations of touch, or phantasms of colour are possible only to a soul that informs a body, and can only be elicited by modification of an animated system of nerves, intellectual judgments are not the results of a stimulus of a sense-organ, but are products of purely spiritual action. "The inferior mode of mental life is awakened by the irritation of sentient nerves, the superior activity is due to a higher reaction from the unexhausted nature of the mind itself; and the ground for this reaction lies in the fact that the same indivisible soul is the root of both orders of faculties." (ib. p. 242).

*B. Perception. Imagination.*—These are shown on both the II and the III plane. (Cf. § 155).

*C. Concepts v. Images.*—The formation of concepts must be distinguished from that of phantasms, or images. The concept is a representation of objects of a class; the image pictures only one particular colour, shape, size, etc. The concept is fixed, immutable, and has no relation to time. The image is unstable, contingent, and fluctuates. The concept represents the nature or essence in an abstract condition, "ignoring or prescind[ing] all accidental individualising conditions." "The image reproduces the object clothed with these concrete determinations." (Ib. p. 237).

*D. Thought.*—This cannot be called a "sensation," as shown by the question raised by Balmez (quoted in Maher, p. 243): "Is the perception of the difference of the smell of the rose and that of the pink a sensation? If we answer that it is not, we infer that the judgment is not the sensation transformed, for it is not even a sensation."

*The mechanism of thought.*—"The external objects stimulate the senses and effect a modification of the sensuous faculties." The result is a sensuous percipient act. "A sensuous phantasm arises in the imagination. The intellect now acts and abstracts the essence, thereby generating the concept which expresses the essence of the object. This abstract concept is then viewed by 'reflection' as capable of representing any member of the class. A formally universal idea is now constituted" (p. 311). "By comparison, reflection and generalization, the idea is elaborated till we attain to the distinct and precise concepts or ideas which accurate science demands" (Maher<sup>11</sup>: vii. 633).

*E. Reasoning.*—This is defined as a process in which a succession of cognitive acts representing the various "notes" of a thing are unified, through relations being established between them. It is the opposite process to intuition. By intuition, one single act conveys all that can be known of a thing. The faculty of reason seeks new and differential characteristics. The most minute differences are essential. It includes: discerning power, sense of discrimination, classifying power, sense of proportion; observing power for (a) things, to see analogies and resemblances between them; (b) persons: e.g., character reading; (c) ideas, which link this faculty to that of the intellect. It also includes the attributes of orderliness, method, sense of absurdity, and therefore merriment, humour, wit, sarcasm, ridicule; curiosity, mimicry, character-interpretation as by actors; arguing, and reasoning power pure and simple.

*F. Intuition, or intuitive knowledge.*—This term is variously used. In the present volume it is intended to refer to a particular kind of knowledge obtained through the use of the intellect, as applied to many of the topics of medicine. That which is called esoteric knowledge, or "wisdom," may be included under this heading. Foresight, so-called mystical interpretation, insight are obtained by the use of the intellect influenced by mature experience. In medicine, as well as in daily life, we may

"Look with spirit-eyes, and lo! shall see  
Glory in every leaf o'erwaves the head."

(Night 94; Burton ii. 39).

"The spirit of faith is the habit of seeing everything in God, and God in everything."  
Fr. Plus.

From the Scholastic point of view, the following are proper propositions:

- (1) All knowledge begins in the data furnished by sense-experience.
- (2) Primary principles are known by intuition.
- (3) Abstraction and discursive reasoning are the instruments wherewith we discern the nature of the data of sense-experience, their laws and causes. Through these two *servants* of intuition the mind gains a scientific and philosophical knowledge of things (Sum. Theol. i. 58, a. 3; II-IIa. 49, a. 5, ad 2m.). Through the same two servants of intuition we arrive at the notion of immaterial beings and of God Himself<sup>12</sup> (i. 12)<sup>14</sup> (I, 84-88).
- (4) "Concepts and reasoning, therefore, are in themselves inferior to intuition; but they are the normal" (i.e., usual, or most widespread) "processes of human knowledge."

"For the Schoolmen, the intuitive act of intellectual knowledge is by its nature the most perfect act of knowledge, since it is an immediate apprehension of and contact with reality in its concrete existence, and our supreme reward in the supernatural order will consist in the intuitive apprehension of God by our intelli-

gence: the beatific vision. But in our present conditions of earthly life our knowledge must of necessity\* make use of concepts and reasoning" (Sauvage<sup>17</sup> vii., p. 83).

§ 162. OCCULT PHENOMENA AND POWERS.—I. Common usage applies the term "occult" to such phenomena as psychic power, healing power, thought-reading, telepathy, clairvoyance, crystal-gazing, fortune-telling, discernment of the future, interpretation of dreams and visions, medium-ship, character-delineation (e.g. palmistry), divination, magic, sorcery, hypnotism, obsession, "willing" another who is at a distance to perform some desired personal service. Such phenomena are studied in theosophy, hermetic science, astrology (and medical astrology), spiritualism, Christian science, and also figure in new-thought movements and many other revivals and elaborations of ancient pagan pursuits.<sup>17</sup> (ii. 19; xi. 199.)

Whereas in all these cases there is the suspicion of trickery, deception, fraud, charlatanry, the term "occultism" is quite properly applied in an entirely different manner,—namely, to the investigation, by the use of reason and logic, of the occult (i.e., hidden, not self-evident) causes and effects operative in ordinary human affairs. The events of one's own daily life, and those of one's fellows, are all natural sequences of previous behaviour. This is not realized, and wrong conclusions are apt to be drawn—such as ascribing good or ill fortune to "fate," or an extramundane agency, or to the deliberate ill-will of others. Better knowledge of such a subject would enable one to avoid misjudging others, and to help them better, by realising that every soul has his own way to go and his own manner of proceeding on that way, toward the one final goal of all.

II. Occult phenomena in the common meaning of the term are (a) true, (b) false. The latter are achieved by deception, or illusion, charlatanry, or may be evidence of self-deception, or of disease (hysteria, neurasthenia, mental disorder, insanity). The former belong to two categories: (i) *Impersonal*; that is, explicable according to physical laws, though at present only imperfectly understood. Such phenomena manifest sometimes in inanimate objects, sometimes in organized beings—animal or human (in virtue of their possession of a receptive nervous system). (2) *Personal*. (i) *Natural*; that is, manifested in human "nature" (a) actively—in the case of phenomena of the kind referred to in § 163; (b) passively—in which case the phenomena manifested in one person originate in another or in numerous others (e.g. crowd-psychology), or in "supernatural" beings. (ii) *Supernatural agencies*: (a) so-called disembodied spirits; (b) angelic beings—good and beneficent, or bad and malevolent, evil, satanic; (c) the Supreme Being.

III. The word "supernatural" has another application which is properly and accurately explained only in Catholic philosophy (see Cuthbert,<sup>117</sup> p. 28, sqq.; Poulain,<sup>154</sup> chap vi; Vassall-Phillips<sup>96</sup>: etc.). Ordinarily, the human being lives a "natural" life, however cultured, unselfish, altruistic, pious, virtuous. He may live a "supernatural" life, by entering a "state of grace," so that the human nature is transcended (*super*), as indicated by Plane V in the

\* The lives of the saints, however, show that for them at any rate there was very often *not* such "necessity."

Chart. While living such a life, phenomena may become manifest (e.g. visions, revelations) which must not be confused with those called "occult."

IV. *Emotional states as a basis of occult phenomena.*—Strong emotional states may impress places and things sufficiently to affect other persons in the absence of the original impressor. Obsessions and haunted places are accounted for in this way. "A place or thing such as a weapon or article of furniture, almost anything in fact which has played a part in events that aroused very intense emotional activity on the part of those who enacted them becomes itself saturated as it were with the emotions involved. So much so that it can influence people of exceptional sympathetic powers and enable them to observe the original events more or less perfectly as if they were enacted before them. Thus in some cases the person will see the occurrence as if taking place before his eyes." (Pater,<sup>146</sup>; cf. Benson.<sup>157</sup>)

V. *Occult powers natural to human beings.*—Some of the powers enumerated in the previous section are inherent in the human organization. They remain latent, or they develop more or less unwittingly as life advances, or they are developed by suitable training. In a few persons they are naturally so decided as to constitute a special talent, which may have been inherited.

The possession of psychic powers (clairvoyance, telepathy, thought-reading etc.) is sometimes looked on as evidence of special favour, or "spirituality," or of superiority (being a "very advanced soul") to be emulated. Such powers are taken as evidence of sainthood in Islam<sup>62</sup> and among Buddhists<sup>22</sup>. In the case of Christian saints, such phenomena are regarded as incidental, and not a criterion of sanctity. Not only is there no relation between the presence or absence of such powers and the virtue of the individual, they are attainable apart therefrom.

VI. The *basis* in the human constitution *upon which such powers depend* is fivefold:

- |  |    |    |                  |
|--|----|----|------------------|
| (1) The vital faculty (161; § 134): vitality           | .. | .. | Vegetative Life. |
| (2) Instinct (180; § 153)                              | .. | .. | Sensitive Life.  |
| (3) The emotional make-up (159, 164 <sup>11</sup> ):   |    |    |                  |
| (The scholastic concupiscible and irascible phenomena) |    |    | Sensitive Life.  |
| (4) The imagination                                    | .. | .. | Sensitive Life.  |
| (5) The reasoning powers; deductive logic              | .. | .. | Rational Life.   |

§ 163. The following powers are specially pertinent to medicine:

(i) *Ability to read character.*—Fundamentally, this is the instinctive discernment of friend from foe. It exists from infancy, and is to be observed among domestic animals. With the development of reason, the consciousness becomes more and more aware of the attractions and repulsions produced by another individual, whether actually present or only thought of. As life proceeds, the contact with relations, friends, acquaintances, and strangers, leads to better knowledge of character, though perhaps nothing more than a form of "worldly wisdom." The reasoning power may be deliberately brought to bear, since delineation of character is amenable to rule, and can be studied, and taught to others.\*

\* The Chinese sought to establish a relation between character and physique as long ago as 450 B.C. (Wieger, 144).

As in business, so in medicine, it is a subject worthy of attention. Indeed it is always imprudent to neglect it.

(ii) *Telepathy. Thought-reading.*—These depend on the first three of the above-named powers, and not on reason. They cannot be learned from books, and the experience cannot be taught to others. The most striking examples of genuine powers of this kind are furnished between (a) parent and offspring, when there is intense mother love; (b) persons between whom there is special friendship; (c) husband and wife, when there have been years of unbroken mutual understanding.

Since they are powers inherent in human nature, they may be developed gradually by concentration and will-power, exerted—not over others, but over oneself. (Cf. P'u Sung-Ling.<sup>153</sup>)

(iii) *Healing power.*—(a) *Involuntary.* Success or failure in the handling of many cases in ordinary practice is usually ascribed to the concrete methods employed or the appliances used. Yet it is often thought that the personality of the doctor (whether he be specialist or not) has at any rate something to do with the efficacy of the treatment.

The following factors contribute: *inspiring confidence*, the bodily state being influenced through the emotions; *possession of great vitality*, which favourably influences a debilitated state through the vegetative powers, even apart from actual personal contact; *will-power* even if used unconsciously has a bracing effect on the patient; *psychic power*, even when the owner is unaware of it, may directly influence endocrine and hormonal (e.g.) activities beneficially, and the vegetative life in general. A disharmonious person will actually drain vitality from a weakly person.

The mother's touch takes away the bodily pain of her little boy.

(b) *Voluntary.*—Among the laity there is sometimes a deliberate attempt made to develop so-called specific psychic healing powers, through healing circles, and the like (theosophy, Christian science, etc.).

The fact that such practice is at the expense of exact anatomical and physiological knowledge and is exalted above medical training, cannot but arouse condemnation. Medicine herself is not a little responsible for the rising up of "healers," in her lack of appreciation of the insistent reality to many patients of the sufferings which she cannot explain or find a physical basis for. On the other hand, if the "psychics" possessed genuine powers, they would not lose them by going through the proper doors of the medical curriculum, and their patients would be the gainers.

(c) *Miraculous healing.*—By this term is meant supernatural intervention apart from human instrumentality.

Of this it might be said that Medicine would not suffer by candidly acknowledging its occurrence through her leading voices. Not to do so exposes her to disrepute in the minds of those who have experienced the cures, or have personally met with such cases. Though ignorance in various forms (prejudice, intolerance, party spirit) is inevitably in her ranks, it should not be chargeable to Medicine herself.

"The sectarian thinks that he has the sea ladled into his private pond."  
(Tagore, *Fireflies*, 209).

#### § 164. LISTS OF TERMS APPLICABLE TO MENTAL FACULTIES AND AFFECTIONS

Individuals may be described in terms of a series of "notes"—the physique, the emotional make-up, the temperament, or disposition,

the character, and the talents or intellectual capacities. These together make up the "individuality."

The following lists under each "note" do not attempt completeness, and some of the descriptive words might be placed equally under other headings than those given.

I. *PHYSIQUE*.—(i) *General*.—Robust, spare, wiry; strong or delicate ("constitution"); good or deficient.

(ii) *Special*.—Classified according to the nine systems of Dr. Abbott's<sup>113</sup> classification; or according to such types as these (Stanton<sup>\*105</sup>)—vegetative, thoracic, glandular, muscular, osseous, nervous, etc. *Basis*: features of the face; size and shape of head, hands, fingers, feet, etc. Throughout, it is necessary also to specify the *qualities* of strength and weakness in their degrees (i., slight, or minimal; 2, moderate; 3, normal, average, mean, or "equable"; 4, well-marked; 5, very well-marked or excessive).

II. *EMOTIONAL MAKE-UP*.—Classification according to the five headings of the table in § 160. *Basis*: the character and phase of the breath; the degree of vitality; the dominant imponderable element; the dominant humour. To draw up a formula to represent the emotional make-up conveniently for clinical work, the initial letters of the (Latin) names of the emotions may be used, the dominant emotion being expressed by a capital letter. Degrees of intensity are indicated by index figures drawn up as in the preceding paragraph. For example, a "Timor"-person might be represented by the formula  $g^2 l^2 tr^1 i^1 T^2$ ; an "Ira"-person might be represented by  $g^1 l^3 tr^1 I^5 t^1$ .

*LIST OF WORDS DESCRIPTIVE OF THE SEVERAL EMOTIONS*.—These are arranged alphabetically, and not according to order of severity. In some cases the words apply also to mental states or attributes sometimes associated with the given emotional-type.

*Joy*: blissful, buoyant, ecstatic, enraptured, enthusiastic, entranced, exalted, excited, gleeful

*Delight*: affectionate, amorous, cheerful, contented, eager, excited, gay, inquisitive, lively, love of (a) objects (collecting spirit), (b) wealth in various forms; (c) opposite sex; pleasure; sentimentality; sympathetic. (Some of these convey ideas associated with this emotion).

*Sorrow*: aching heart, affliction, anguish, anxiety, bitterness, broken-hearted, chagrin, cheerless, dejected, depressed, despondent, discontented, displeased, disquieted, distressed, fretting, gloom, grief, infelicitous, inquietude, languishing, low-spirited, miserable, mournful, sense of (a) desolation, (b) disgust, (c) dryness, or aridity, (d) repugnance, (e) uselessness, solicitude, sorrow, stricken, tepidity, tribulation, troubled, unhappy, weak, wretched.

*Anger*: acrimonious, aggressive, ambitious, bellicose, bitter, boiling, bold, bristling, cantankerous, capricious, captious, caustic, choleric, churlish, contentious, contrary, cross, cynical, daring, desperate, displeased, easily offended, exasperated, exception, excitable, fierce, fiery, fractious, fuming, furious, hasty, having hatred, impetuous, indignant, infuriate, irate, irritable, irritated, jealous, passionate, peevish, petted, petulant, pugnacious, quarrelsome, querulous, rabid, raging, relentless, resentful, severe, shrewish, sore, storming, sulky, sullen, suspicious, tart, testy, vengeful, vexed, vindictive, violent, virulent, wrathful.

*Fear*: afraid, aghast, alarmed, anxious, apprehensive, astounded, brow-beaten, cowardly, cowed, coy, craven, daunted, despairing, despondent, diffident, discouraged, dismayed, disquieted, dreading, envious, faint-hearted, faltering, fearful, fidgety, flinching, flurried, frightened, fussy, gentle, harassed, hesitating, horrified, horror-struck, irresolute, irritable, jealous, mistrusting, nervous, panic-stricken, penitent, perturbed, pious, pusillanimous, quailing, quaking, quavering, repentant, restless, scared, scrupulous, shrinking, shuddering, shy, skulking, sly, solicitous, startled, suspicious, temperate, terrified, terror-struck, timid, timorous, trembling, trepidation, unmannered, weak-hearted, whining, worrying.

*Moods. Moodiness. Disposition*. "Moods are the waves rising in your heart." They are due to the changes in the breath from hour to hour or day to day. The rate of change varies in different persons. When the change is comparatively frequent, the person may be described as "moody,"—changeable. This character may occur more at some periods of life than others, in the same person. Thus, it is more frequent at puberty and during youth. It is possible to rise above the cycle of moods, by the exercise of self-restraint. Moods change with surroundings (places and people).

III. TEMPERAMENTAL TYPE, OR DISPOSITION.—*Basis*: the humoral formula. This is expressed outwardly in differences of (a) texture—varying solidity of the tissues of the body; (b) development of the various parts of the body; (c) rate of activity of (i) vegetative processes—nutrition, waste, formation of germinal cells, etc., (ii) expenditure of nervous energy; (d) tonicity of muscles and nerves. The words descriptive of temperament often apply also to II. Examples: aggressive, amiable, austere, buoyant, capricious, cheerful, chilling, churlish, complacent, conservative, courageous, depressed, despondent, discontented, energetic, enthusiastic, excitable, fastidious, forbearing, fretful, forward, gushing, harassed, impetuous, indolent, intolerant, irascible, irritable, jealous, malicious, moody, obstinate, petulant, querulous, rebellious, reckless, remorseful, ruffled, secretive, spiteful, stubborn, submissive, suspicious, taciturn, tranquil, tyrannical, uncompromising, unforgiving, verbose, vindictive, zealous.

Many of these terms also apply to the description of II and IV.

It is worth noting that among these types there are many which are supposed to be evidence of high human aspirations, and yet strictly belong to the "lower mind." Hence it has been very truly said: "Those sweet affections which incline the heart to God . . . come from the sensitive temperament, or bodily disposition, rather than from the solid piety of reason, and are carnal rather than spiritual" (Lasance<sup>120</sup>).—"Things that are apparently of the highest order in knowledge and art and sentiment are not things of the spirit, but things of the senses, alike in the philosophy of Thomas Aquinas and in the modern researches in the domain of the brain" (Vonier<sup>97</sup>).

IV. CHARACTER.—This is really a collective term, since all the other "notes" contribute to it. The terms which describe character may be grouped under sensuous, intellectual, moral, and æsthetic groups, or under the five sub-divisions of Mind in Sufi terminology (Ego, Memory, Mind, Heart, Conscience). Many terms have more than one component, and therefore do not belong strictly to one group alone.

*Ego*: *Positive*: acquisitive, amative, approbative, artful, artless, avaricious, arrogant, boastful, churlish, domineering, gluttonous, grasping, grouching, inquisitive, jealous, lewd, licentious, loud, obdurate, obstinate, pugnacious, quarrelsome, sociable, superstitious, vain, voluptuous, worldly. *Negative*: abstemious, apathetic, hasty, indolent, indulgent, miserly, shy, timid, unselfish, weak.

*Heart*: *Positive*: accessible, adaptable, affable, altruistic, ardent, benevolent, contemplative, emotional, charming, compassionate, facetious, fascinating, frivolous, gay, harmonious, hospitable, lively, peaceable, philanthropic, sincere, simple, tranquil.—*Negative*: tepid, meek, lenient.

*Conscience*: *Positive*: ascetic, austere, blameless, brave, conscientious, conservative, courageous, diligent, exacting, fastidious, humble, industrious, persevering, scrupulous, sensitive, strong-willed, thorough, truthful, well-balanced. *Negative*: deceitful, defiant, flippant, impetuous, impulsive, imprudent, malicious, pusillanimous, resentful, slow, treacherous, unforgiving, ungrateful, unsociable, untruthful, vindictive. (The moral sense may be absent).

*Mind*. Agnostic, ambitious, brusque, censorious, cunning, enterprising, foreseeing, intellectual, loquacious, methodical, opinionated, orderly, plausible, practical, prejudiced, refined, reticent, satirical, sceptic, serious, stilted, subtle, superstitious, uncompromising.

It should be noted that character is (a) native and unalterable (whatever some educationists say); (b) capable of being fashioned by the will of the person himself or by that of the persons amongst whom he lives. To have a "strong character" is considered the highest ideal by many; (b) is therefore much advocated. But this idea is not necessarily true. Animals have character in that different kinds of ego are as it were personified in them. (cf. Paracelsus<sup>29</sup>, p. 209).

Character is necessarily intimately related to physique, emotional type and temperamental type. Hence character delineation is possible from a close study of those aspects.

The skeletal system (bones, joints, ligaments, muscles, etc.) is the expression of the character of the cerebral nervous system. The viscera are the expression of the character of the vegetative

system. Hence it happens that the usual autopsy discusses the least important part of the "case." (See §127.)

*Interests.* Ex.: personal interests: the preservation of one's life and health and general welfare; interests of the family; of the social circle, etc. Interests manifested in the use of the various talents.

V. TALENTS.—These are best classified according to the subject-matter to which the mind is directed; though they may be classified according to the faculty concerned.

*Mechanical*: constructiveness; architecture, etc.; technology.

*Scientific*: all branches of learning; mathematics, sciences, logic, analytical talents; calculating powers. Domestic science. Administration.

*Intellectual*: all branches of knowledge. Philosophy, history, sciences.

*Æsthetic*: arts and crafts, music, sculpture, designing, painting, poetry, literary art, dramatic art; wit; women's crafts of all kinds; poise.

*Imaginative*: originality; inventiveness.

*Moral*: perseverance, concentrating-power, law.

*Other talents*: language; intuitive perception; foresight; pedagogy; rhetoric; vocal.

*Social*: domestic interests; love of children, of home.

*Political. Military. Sport* (athletics, acrobatic art, adventuresomeness).

*Commercial life.* Agriculture, Husbandry.

Much overlapping is necessarily present in preparing such a list. It might be extended to include all the subjects taught in universities, and schools of all kinds, for persons of all ages.

#### § 165. INTERACTIONS BETWEEN THE VARIOUS ASPECTS OF THE SOUL.

I. INTELLECT.—Acts on vegetative life via emotions. (Effect of emotions on bodily functions: § § 139, 160)

Is acted on by—

(a) *Vegetative life*: physical desires, sense-impressions, especially in dream states and the like.

(b) *Sensitive life*: psychical desires, either in oneself or from others. The imagination influences it in hypnosis.

(c) *The will*: compelling attention or forcibly diverting attention.

(d) *Other wills*: ditto, includes angelic intelligences as well as human.

II. REASON.—Acts on vegetative life via the emotions, with their desires and fears.

Is acted on by sensitive life. Emotions strongly affect the reason in people of certain dispositions.

III. THE WILL.—Acts on *vegetative* life—effecting exterior actions.

Acts on *sensitive* life. Through sensuous cognition it acts on the emotions; feeds or starves or fails to starve the sensitive appetite, and so acts in the same three ways on the emotional states, aided by reason.

Acts on the *practical understanding*: with the aid of bodily mechanism it leads to the performance of useful or artistic work.

Acts on the *speculative understanding*: produces acts of judgment, or worship, or contemplation.

Acts on the *intellect*: "concentration."

Acts on the *memory*: "recollection," watchfulness.

Acts on *itself*: brings perseverance in the performance of a design conceived and elaborated by the intellect.

*Actions upon the will*:

*Intellect*: as when this propounds to the will what is the greatest good; conveys sense-impressions to the will.

*Emotions*: anger is very powerful in nullifying will to good, and increasing will to evil. So also, fear of another person, fear of an idea, fear of a thing. Passions hinder the judgment, and so affect the will. Emotions can be sublimated by inter-action with Plane V.

*Sensitive appetite*: this acts directly on the will. If the objects of both appetite and will coincide, the will is strengthened; otherwise it is weakened. "The passions modify the organic conditions and this influences all cognitive faculties, and their intensity may prevent the mind from applying itself to the higher operations of the intellect and will" ("9, 10, 77; "I., p.656).

*Vegetative life*: the corporeal state affects the will.

*Environment*: circumstances of life, personal atmosphere of neighbours,

etc. ; presence of persons of strong will, all interfere with or modify the actions of the (patient's) will.

*Diseases of the Will.*—Inconstancy, irresolution (lack of energy), impulsiveness (excess of energy ; excitability), and "mortal sin" (domain of moral philosophy).

IV. PRACTICAL APPLICATION.—The fact that feelings, imaginations and thoughts influence the character is of the greatest practical importance, but by using the will-power to control them all, one becomes also master of one's life and "fate." Each emotional "note" has its own effect on body and mind, and can be over-ruled by the will. The influence of the imaginations is implied in the phrases "looking on the bright (or dark) side of things." Cheerful, gloomy, constructive, destructive, upright, deceitful thoughts all affect the sum-total of the conduct, the attitude of the mind towards others, and can all be over-ruled by the will.

"If the endowment is great in one direction, it is at the expense of some corresponding defect in another direction, as when tender-hearted men are lacking in judicial faculty, while men in whom the judicial faculty is prominent tend to be tyrannical" (Chu Hsi,<sup>10</sup> p. 59).

The study of all such interactions as are suggested by the lists of synonyms above given affords a better idea of what constitutes ideal "balance" in regard to the various components of the human being. A more graphic and tangible idea is at the same time obtainable in this way of much of the subject-matter of ethical and moral philosophy. To assign a distinct place for it in the domain of Medicine is not to disown the precedence of religion.